

Nova Scotia Public Education Teacher Demand and Supply

Research Paper



RESEARCH PAPER**NOVA SCOTIA PUBLIC EDUCATION TEACHER DEMAND AND SUPPLY**

January 2000

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Executive Summary

This study examines the teacher labour market situation in Nova Scotia and the outlook through the 2009-10 school year. It has been conducted in response to education community concerns about a potential growing shortage of public education teachers, including substitute teachers, stemming from the recruitment of new teacher education graduates from other jurisdictions and the retirement of about one-half of the teacher labour force over the next 10 years.

Issues

A variety of issues are examined in this paper in order to gain an understanding of the context of the teacher labour market. As well, the paper reviews the factors that are likely to impact the demand and supply of teachers.

Nova Scotia Situation

Nova Scotia school boards are operating in a setting where they have experienced increased difficulty in hiring teachers for certain disciplines, including substitute teachers, particularly in rural areas. Recruitment of education graduates is also complicated by the fact that teaching contracts cannot be offered until August, after budgets are determined.

However, since the early 1970s, the teacher labour market in Nova Scotia has been oversupplied. In 1994, the Nova Scotia Council on Higher Education took steps for the reorganization and rationalization of teacher education programs. This involved increasing the years of study for a Bachelor's degree to two years, decreasing the number of teacher education institutions from seven to four (Acadia, Mount Saint Vincent and St. Francis Xavier universities for English speaking students and Université Saint-Anne for those speaking French), and reducing the number of graduates from about 900 to a target of 300-350. In the same year, a four-year Early Retirement Initiative Program for teachers was introduced resulting in 2,184 retirements through July 1999.

Other Jurisdictions

Within other provinces, it is evident that there is not presently a shortage of teachers, however, it is acknowledged that problems may exist in filling positions in certain subjects and more remote regions. It is also expected that about half of the current teacher workforce will retire in the next decade, as is the case in Nova Scotia. In the past, Canadian universities have expanded to accommodate more students when shortages of teachers have developed, and they maintain this ability for future needs that may arise.

In the United States it is apparent that a systemic shortage of teachers does not exist, however, shortages do exist in certain regions and subjects due to enrolment changes, teacher retirements, and occupational mobility of teachers. A number of states experiencing shortages have implemented various incentives and teacher qualification revisions to assist in meeting their high demand for teachers. Examples include signing bonuses in Texas, low rate mortgages/loans in Maryland, and emergency teacher certifications in California. However, the United States is not viewed as a large drawing point for Canadian teacher education graduates since teaching positions appear relatively less desirable and will not likely grow more attractive as long as suitable employment is available in Canada.

Supply Factors

In considering the teacher labour market, the incremental supply of teachers is measured with respect to the certification of teachers. Once certified, an individual is qualified to teach in public education in the province without time limit. Also, nearly all permanent teachers enter the profession as substitutes. Accordingly, the employment status of those in the workforce, including the flows or changes, is also considered, including permanent, probationary, term, and substitute teachers.

While substitute teaching is an important entry point and supplier of permanent teaching positions, this study notes that the average number of teaching days for a substitute teacher is 52 with a current pay rate of \$109 per day. This is examined in the framework where the present average salary for regular teachers (permanent, probationary and term) is \$49,246.

Effects of Curriculum Changes

The effects of curriculum changes on the demand for teachers is examined at the elementary, junior, and senior high levels and it is evident that the main impact has been isolated within the senior high level. On balance, changes in elementary school curriculum have not significantly altered the labour market for elementary school teachers. Within Junior High School the labour market impact of French or English becoming compulsory courses has been minimal, because nearly all students were already taking the subject as an elective. In High School the Public School Program has undergone significant changes since 1992-93 including increasing the number of credits needed for graduation, increasing compulsory subject credits, and decreased length of instructional hours per credit. The increase in number of credits for graduation has not had a major impact on enrolment or teaching effort, mainly because many students were already taking more than the minimum. However, the addition of compulsory half credits in Career and Life Management and Physical Life Styles has impacted enrolments, nearly doubling from 11,000 in 1996-97 with a commensurate increase in teaching allocation growing from 1FTE in 1995-96 to 43 in 1996-97 and 78 in 1997-98.

Also considered is the impact of computer technology on the teacher labour force. The goal of the Department of Education is to attain a student-per-microcomputer ratio of 5:1 in the year 2005. While the increased availability of instructional computers will have an impact on teaching approach, the required number of teachers is not expected to be affected.

Overall, it is expected that new curriculum and methods as well as increased availability of technology, will not significantly impact the number of teachers required. The most significant need will likely be for more substitute teachers to replace regular teachers on a short term basis while they undertake professional development related to curriculum changes, implementation planning, and the utilization of new technology.

Changes in Class Size and Enrolment

For the purpose of estimating the future demand for teachers, this study does not project any further increase in the number of teachers to reduce class size beyond the 77 that had been committed starting in 1998-99 through the work of Regional Class Size Action Committees. Additional funding to reduce class size has not been identified, however, new school construction will help to achieve more even balance in classroom size and more effective use of teachers and administrators. The consolidation of smaller outdated schools through new school construction will add to the availability of classrooms.

Nova Scotia has experienced a trend of declining enrolments which reflect the waning number of grandchildren of the 'baby boomers', and this is a similar trend to elsewhere in Canada and the United States. During the 1992-93 to 1998-99 period, the average annual rate of enrolment decline was 0.6%. In 1998-99 to 2003-04, the decline is expected to increase to an average annual rate of 1.1%, being more pronounced at the elementary level (-1.7% per year). In the 2003-04 to 2009-10 period, the overall decrease is estimated to be 1.5% per year. The declining trend in enrolments has and will result in a proportionate decrease in the requirement for teachers.

Attrition

Attrition is considered with respect to the demand for teachers including retirement, disability, death and occupational mobility. The most significant of these is the retirement of about 54%, or 5,206, of the current teaching workforce, before or by 2009-10. Before 2001-02 the number of retirements will

be relatively low, and thereafter the number eligible to retire ranges from 477 in 2001-02 to 671 in 2005-06. Disability related to accident or illness is of relatively low incidence among teachers, and based on historical data this study assumes 20 disabilities affecting employment per year in the period 1998-99 to 2009-10. Similarly, the number of teachers who die while employed is relatively small and in the projections for this study it is assumed that 10 per year will occur. Occupational mobility, is difficult to predict since teachers leave employment for a number of reasons such as new job opportunities, job dissatisfaction, accompanying a spouse migrating to another region, or withdrawal from the workforce. An annual occupational mobility of 120 teachers per year is assumed in demand projections, which is in the range of recent experience.

Demand for Teachers

Overall Demand

The demand model utilized in this study is based on the change in the number of teachers employed annually, which is affected by factors including enrolment and the ratio of students per teacher. In addition, requirements for additional teachers to fill the demand created by attrition, as noted above, is included in the model. Projected demand for teachers is indicated as full-time equivalents (FTEs) since the incidence of part-time employment of regular teachers is negligible.

Declining enrolments will reduce the required number of teachers and administrators by a total of 1,444 FTEs in the period from 1998-99 through 2009-10. This will be offset by the need to replace 1,807 FTEs due to occupational mobility, disability and death. The most significant demand will stem from scheduled retirements, totalling 5,206 teachers. Overall, 5,569 teacher and administrator FTEs will be required over the ten year period of which about 95% will be the result of scheduled retirements.

Demand by Subject

An important perspective is the subject qualifications required of new teachers to enable them to replace the teachers who were teaching various subjects. Requirements by subject are projected on the basis of retirements. The leading secondary level education subjects requiring new teachers in the next decade are first language English, Social Studies, Mathematics, Science, and Family Studies. Elementary teaching in this study is classified as a subject in itself. The need for elementary school teachers is projected to be 796 FTEs in 1998-99 through 2003-04, and nearly doubling to 1,714 in 2004-05 through 2009-10. There will also be a significant demand for administration positions, estimated to 294 in 1998-99 through 2003-04, increasing to 363 in 2004-05 through 2009-10.

Supply of Teachers

Overall Supply

The supply of teachers in this study refers to the annual number of new entrants and re-entrants into the public education teacher labour force, who are qualified and will likely seek teaching positions in Nova Scotia. Re-entrants refers to previously eligible entrants, not working as teachers, who would accept a teaching position in the province.

The primary measure of the annual inflow of potential new teachers is the number of teaching certifications issued by the Department of Education. The study notes that the supply of teachers has been affected by the rationalization of the teacher education programs in Nova Scotia instituted in 1994, which over a four year period reduced the number of Bachelor of Education graduates from 900 to approximately 350 per year. The annual supply of new teachers is approximately 580, comprised of graduates from Nova Scotia teacher education programs, as well as new teachers trained outside of the province, including other provinces and other countries (this total is net of

about 20% of graduates from provincial education programs who have a home address outside of Nova Scotia).

Supply by Subject

The academic majors of individuals certified to teach in Nova Scotia provide an indication of the subject areas in which they would be considered qualified to teach. During the period 1992 through 1998 there has been a notable consistency in the pattern of academic majors of prospective teachers obtaining certification. When considering secondary education subject clusters, it was found that 62% of the majors pertain to English, Social Studies, and Physical Education. Within subject clusters, a number of specific subjects also tended to be prominent. This was most evident in the cases of History (53%) within the Social Studies, Biology (64%) within the Sciences, and Music (90%) within the Fine Arts.

Demand and Supply Outlook

Comparing the anticipated supply of 580 new teachers into Nova Scotia public education per year with the projected demand for teachers, it appears that there will be an excess in the annual supply of teachers from 1998-99 through 2002-03. The longer term outlook is for the annual demand for teachers to be greater than the supply in the years 2003-04 through 2006-07, with a peak difference of approximately 120 teachers in 2005-06. From 2007-08 through at least 2009-10 the labour market turns again to excess annual supply. In this context it must be noted, however, that the starting point for the public education labour market in 1997-98 is one of oversupply, with an excess of teachers who are unable to secure regular teaching employment. In large part, the oversupply has created a problem of significant underemployment of the substitute teacher workforce which is summarized in the section which follows.

Given the initial labour market condition of oversupply, the demand and supply projections suggest that there will be continued, or worsening, oversupply from 1998-99 through 2002-03. In this five year (inclusive) period demand is projected to total 1,606 teachers compared to a new supply of 2,900. Even though demand is anticipated to exceed supply in the period from 2003-04 through 2006-07, there will not be significant relief for the oversupplied market. Total annual demand for teachers in these four years is 2,577 compared to a total new supply of 2,320; a difference of only 257 teachers.

The study examined data on the qualifications of certified individuals (according to their academic majors) compared to the projected average annual demand for teachers by subject cluster in the six year (inclusive) periods 1998-99 through 2003-04 and 2004-05 through 2009-10. This indicates a significant mismatch in each six year span. If this pattern of academic majors for new teachers continues, then the supply of teachers will be approximately three times the future demand for Fine Arts majors and English majors, four times the demand for Social Studies majors, and as high as ten times the demand for Physical Education majors. While it appears that the supply of new Science teachers will be three times the demand, the over representation of Biology majors in the supply of this group may suggest that there will be a shortage of Physics and Chemistry majors. The supply of mathematics majors will be nearly one-third the projected demand. Also significantly under supplied will be new teachers of Technology Education and Family Studies.

According to the 1998 pattern of teaching certificates by subject major, the number of new teachers with an academic background suitable for elementary education would be 82% higher than projected demand in 1998-99 through 2003-04, but would fall 14% short of demand in the 2004-05 through 2009-10 period.

The apparent imbalances of supply and demand by academic subject are indicative of a situation where there are both shortages and excesses of new teachers at the same time. Those with

academic capabilities that are plentiful will tend to have difficulty obtaining suitable employment and will not likely be able to establish themselves in a teaching career. Conversely, new teachers with subject capabilities that are in strong demand compared to supply should not face a similar difficulty.

Substitute Teacher Labour Market

As noted previously, most permanent teachers enter the teacher labour market as substitute teachers, however, the progression to a regular position is rather tenuous, with estimates of this probability being 5%. Thus, attrition of substitutes is high and this is demonstrated by the fact that 20% to 27% of substitutes did not teach in the subsequent year during the period of 1992-1993 through 1997-98. Without adequate intermediate income opportunity and the incentive of obtaining a permanent teaching position, the rate of attrition of substitutes will tend to be high.

When estimating the demand for substitutes, an important consideration is the number required at given times when the teacher absence rate peaks. The peak absentee rate is assumed at 10% based on available data. The supply of substitutes pertains to new entrants as well as attrition of the existing substitute pool. The study assumes that attrition of substitutes will decrease as regular teaching employment prospects improve and vice versa. Considering potential supply and demand, the outlook is for the substitute teacher workforce to steadily decline from approximately 2,200 individuals in 1998-99 to 798 in 2007-08, and increase slightly thereafter. By 2005-06 the supply of substitutes is not expected to meet peak demand. The shortfall will range from 2 to 101 during the period 2005-06 through 2008-09, and by 2009-10 the trend will change with an estimated surplus of 92.

Conclusion

The current instances of difficulty in recruiting qualified teachers in certain subjects, and engaging substitute teachers more generally, that are being reported by school administrators in Nova Scotia are a sign of a tightening teacher labour market in the province compared to a traditional condition of substantial oversupply. Similarly, other jurisdictions in North America are not experiencing teacher shortages, however, selected shortages are being reported for teachers of certain subjects.

The projections of demand and supply suggest that there will be continued, or worsening, oversupply of teachers from 1998-99 through 2002-03. Even though demand is anticipated to modestly exceed new supply in the period from 2003-04 through 2006-07, this will not overturn the oversupplied condition of the labour market.

The supply of new teachers at the secondary level is dominated by English, Social Studies, and Physical Education majors. The supply of teachers in these subjects represents up to ten times the demand. Concurrently, there is a shortage of new teachers capable of teaching Mathematics, Physical Sciences, Technology Education, and Family Studies. This has and will, if not addressed, result in a situation where there are both shortages and excesses of teachers at the same time.

The supply of teachers in Nova Scotia has been substantially affected by the attrition of substitute teachers. Substitute teaching is often the first assignment of new teachers. Attrition of substitute teachers is in excess of 500 individuals annually. With the prospect of low earnings and small opportunity for a permanent teaching assignment, the majority of new teachers who start as substitutes drop out of the public education teaching profession in Nova Scotia. It is projected that the supply of substitutes will decline through 2007-08, such that the pool will not be sufficient to meet demands during peak absenteeism in the period beginning 2005-06. There will be a challenge to maintain an adequate supply of substitutes to meet peak, regional, and subject needs.

NOVA SCOTIA PUBLIC EDUCATION TEACHER DEMAND AND SUPPLY

RESEARCH PAPER

ABOUT THIS STUDY

The following research paper was conducted for the Department of Education by a consultant under the direction and advice of officials of the Policy and Program Branches of the Department. This study was organized, researched, and drafted by Andrew Cornwall, a consultant and former employee of the Department, who is an experienced labour market economist.

The study draws upon the information resources available to the Department of Education in the CEDAR System, which provides detailed information on teacher qualifications, status, and teaching history. This information was augmented for this study by data on teacher retirement eligibility obtained from the Nova Scotia Teachers Pension Board. In addition, school board officials contributed details concerning their experiences.

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JANUARY 2000

NOVA SCOTIA PUBLIC EDUCATION TEACHER DEMAND AND SUPPLY

RESEARCH PAPER

1. INTRODUCTION

This is a study of Nova Scotia public education teacher demand and supply carried out by the Nova Scotia Department of Education. This study responds to concerns by the education community in the province that there appears to be a growing shortage of teachers, especially substitute teachers. This concern is heightened by notable recruitment efforts of new graduates of teacher education programs in Nova Scotia by school boards from other provinces, the United States, and elsewhere, which will affect the supply of new teachers. Further, there is attention to the retirement over the next 10 years of one-half of the aging Nova Scotia teacher workforce, which may result in a chronic shortage of teachers. Also, it is felt that a similar pattern of teacher retirements in other provinces and the United States might worsen the situation here. This study examines the background and current situation of teacher demand and supply in Nova Scotia and forecasts the teacher demand and supply through the school year 2009-10. Included in the study is an overview of teacher labour market conditions in other provinces and the United States. The study is intended to provide information and insight regarding the Nova Scotia teacher labour market as a basis for formulating solutions to current and future issues.

This paper contains six sections. The *first* section which follows the Executive Summary is this introduction. *Second* is a synopsis of the current issues facing the Nova Scotia labour market for teachers and indications of teacher demand and supply elsewhere in Canada and the United States. *Third* is a comprehensive background section examining several factors including perspectives of the situation for teachers in North America, the teacher labour market structure in Nova Scotia, changing curriculum emphasis, technology, enrolment trends and teacher attrition, particularly retirements. The *fourth* section examines the demand for teachers in Nova Scotia and includes projections of teacher demand, in total and by subject area, through the year 2009-10. The *fifth* section considers the outlook for the supply of teachers in Nova Scotia, in total and by subject area, and explores the problem of attrition of substitute teachers. Section *six* relates the conclusion of the study. Tables which summarize the data utilized in this study are contained in Appendix A. A *bibliography* is included at the end of the paper.

2. CURRENT ISSUES FACING THE NOVA SCOTIA LABOUR MARKET FOR TEACHERS

2.1 *Current Indications*

Recent comments by school board officials to members of the Department of Education have portrayed an increased difficulty in hiring regular teachers in certain disciplines, and in hiring substitute teachers more generally. One experience mentioned was of a school principal in the Chignecto-Central Regional School Board who had contacted 72 individuals to fill a substitute

teaching assignment, without success. Another report by an elementary school principal in the Halifax area of the Halifax Regional School Board told of routinely needing to place as many as 30 calls to find a substitute; as a last recourse the principal or vice principal would fill in as a substitute.

On March 3, 1999, a newspaper article was published in the *Halifax Herald* under the headline "Boards expect teacher shortages". Another article in the same newspaper, dated March 8, 1999, ran under the headline "New teachers eye prospects outside N.S." These articles relayed the following sentiments of officials representing boards, teacher education institutions, and the Nova Scotia Teachers Union (NSTU) regarding a current or anticipated shortage of teachers.

- School boards experienced difficulties this year finding regular teachers in specialty subjects such as Fine Arts, French, Math, and Science.
- There is a shortage of substitute teachers, especially in rural areas.
- Due to their age distribution there will be a significant increase in the number of regular teachers retiring over the next decade, with the majority of the current teacher workforce needing to be replaced within ten years. There is concern that Nova Scotia's teacher education institutions will not produce enough teachers to fill the demand.
- School boards from elsewhere in Canada and the United States are aggressively recruiting in Nova Scotia.
- School boards in Nova Scotia typically do not hire new regular teachers until August, which places them at a disadvantage compared to boards in other jurisdictions which are prepared to make earlier offers of employment.
- The 2-year teacher education programs in Nova Scotia are superior to the 1-year programs operating in many other jurisdictions, which make Nova Scotia graduates particularly sought after.
- Graduates from Nova Scotia's teacher education institutions may be less likely to accept the prospect of substitute teaching in the province if there is full-time work elsewhere. Among other factors, students are concerned about their ability to pay off large student loans.

2.2 Issues Survey of School Board and Teacher Education Institutions

During the first week of March 1999, Registrar of Teacher Certification at the Department of Education contacted the seven school boards and four teacher education institutions in Nova Scotia regarding labour market conditions for teachers. Information was obtained from six school boards and all of the teacher education institutions.

School boards responded to the question of whether they experienced any difficulty in attracting teachers for the 1997-98 and 1998-99 school years, as follows in Figure 1.

Figure 1. Difficulty in Attracting New Teachers

Teacher Status	School Board Response	
	Yes	No
Permanent/Probationary	2	4
Term	4	2
Substitute	6	0

The subjects (including education administration) where the most hiring difficulty was experienced are summarized below.

Figure 2. Difficulty in Hiring by Subject

Subject/Administration	Number of Boards
French	6
Resource	5
Technology Education	5
Speech Therapy	4
Testing Services	4
Education Administration	3
Music	3
Math	2
Chemistry	1
Guidance	1
Physics	1
Science	1

School boards noted that they were at a disadvantage in recruiting Nova Scotia education graduates because they were not allowed to offer teaching contracts to new regular teachers until August, when school board budgets and staffing levels for the up-coming school year are finally determined.

Five of the six boards providing information expressed the opinion that the difficulty of attracting teachers generally would increase over the next five years.

The survey of the four teacher education institutions provided the following insights concerning their respective current abilities to attract students into teacher education programs and the recruitment activity by Nova Scotia school boards and others for students graduating in 1999.

- The universities training English speaking teachers: Acadia, Mount Saint Vincent, and St. Francis Xavier, reported that they would be graduating a full complement of 350 students this year. Collectively they had in the range of 900 applications for the class beginning in the fall of 1999. The outlook is that the annual production of English speaking teachers is readily sustainable at the current rate.
- Université Sainte-Anne did not train the full complement of its annual allotment of 85 French speaking teachers. Because of a limited number of applicants it would be able to sustain only approximately 20 teacher program graduates per year.
- This year all training institutions observed a high level of activity by boards to market themselves as prospective employers of graduating teachers.
 - Of the regional school boards in Nova Scotia, Halifax has been active at all four training institutions, Southwest at three, Chignecto-Central at two, and Strait at one; no specific marketing activity was noted for the Cape Breton-Victoria nor Conseil scolaire acadien provincial.
 - There has been recruitment by many boards from other provinces, including Alberta, British Columbia, and Ontario.
 - There is recruitment by boards from other countries. Within the United States, boards in North Carolina and Massachusetts were mentioned. Other foreign recruitment has occurred by boards in England, Hong Kong, and Japan.
- The English speaking training institutions commented that Nova Scotia boards were at a disadvantage because boards from other jurisdictions were now able to offer permanent contracts, and had other incentives such as a 'signing bonus' and a transportation allowance for new teachers to return to Nova Scotia to visit.

2.3 Indications of Teacher Demand and Supply Issues Elsewhere in Canada and the United States

This section presents a synopsis of reports and articles, from 1997 onward, dealing with teacher demand and supply issues in other provinces and the United States. The literature was identified during the background research for this study, which included an on-line search to locate articles and publications.

Canada in General

Canada: (*Education Quarterly Review, Spring 1997*) Four factors will interact to determine the nature of the national labour market for teachers: declining student enrolments, increased retirements of teachers, the continuing large output of graduates with teaching degrees, and the existing surplus of teachers. The prognosis: "... there is currently a teacher surplus in Canada and that situation will persist if Canadian universities continue to train teachers at the current rate. Only in Ontario is it likely that teacher supply and demand will be in balance".

(*Job Futures*, current Internet release) Human Resources Development Canada, advises that "looking to the year 2001" the over all labour market for teachers will remain 'fair': "There may be a shortage of teachers in isolated areas, offset by surpluses in urban areas." For secondary school

teachers: "Part-time work is expected to be a major source of job openings over the next five years". For elementary school teachers the job outlook is described as 'good' through 2001, especially for part-time teachers, as new elementary school teachers are needed to replace those who retire.

Other Canadian Provinces

Prince Edward Island: (March 1999, press release) The Provincial government announced a "Workforce Renewal Plan" for teachers which will allow 130 teachers to take early retirement within two years. The objective of the plan is to create opportunities for Island graduates with new teaching degrees, many of whom are now forced to find employment in other provinces, particularly Nova Scotia and Ontario.

Ontario: (November 1998, news release; November and December 1998, Ontario College of Teachers bulletins; November 1998, news item) Using a newly available capability to project the retirement of teachers, the government of Ontario is predicting that 78,000, nearly one-half of the 171,500 teachers in the province, will retire within ten years. Retirements through the year 2002 are being accelerated by an early retirement incentive program. The majority of the retirements after 2002 will occur in the latter part of the decade. Retirement will be a factor in the need to replace teachers in all subject areas, but History, English, Geography, and Technology teachers are noted, as well as school principals. In contrast to the apparent looming demand for teachers within the next few years, the supply of new teachers is low. In the last two years fewer than 8,000 prospective teachers have applied for entrance to teacher education programs in Ontario. There has been a steady decline in applications since the peak of 20,000 in 1990. Past teacher surpluses and the restructuring of public education in Ontario have diminished interest in teaching careers to an "artificially low level".

Although there does not seem to be a current general shortage of teachers in Ontario, shortages are being experienced in specialized areas such as: "French as a Second Language, Maths, Sciences, secondary technology subjects, and teachers able to provide leadership in the use of computers in our schools". The pool of available substitute and term teachers is diminishing. School principals are reporting increased difficulty in hiring new teachers and are stepping up recruiting efforts in other provinces. The problem, however, may not be with the "number of teachers, but having the right teachers with the right qualifications".

Alberta: (February 1998 news item) Alberta could experience a teacher shortage within five years because nearly half of the teachers in the province will retire within the next ten years. But, there is a current oversupply of teachers in Alberta who may be available to fill upcoming vacancies. If there is a shortage, the enrolment restrictions on the University of Calgary teacher education program could be lifted from its present level of 1,200.

British Columbia: (May and October 1998 news items) There may be a shortage of teachers by the year 2002 because of a continuation of the teacher early retirement plan. At present, the labour market is experiencing significant oversupply, and new teachers on average work three years substituting before obtaining a permanent teaching position.

Summary of Other Canadian Provinces: The few articles and reports available for review suggest that there is not a present or immediately forthcoming shortage of teachers elsewhere in Canada. Indeed, the early retirement programs mentioned are in part a response to a problem of oversupply. This is not to say that there are, and will be, shortages in certain subjects and remote regions. A common factor in most, if not all, of the jurisdictions is that during the next decade about one-half of

the current teaching workforce will retire. This is an ominous sounding numeric phenomenon which is easy to quote in articles. Based on past history, however, if a looming shortage of teachers materializes, Canadian universities, within a reasonable time frame, have the capability to accept more students into teacher education programs, and more students will want to apply to them given the prospect of secure and attractive employment.

United States

According to the United States Bureau of Labour Statistics (*1998-99 Occupational Outlook Handbook*, current Internet release; and "The 1996-2006 Job Outlook in Brief", *Occupational Outlook Quarterly*, Spring 1998; "School Work: The Job Outlook for Teachers", *Occupational Outlook Quarterly*, Spring 1997),

The job market for teachers varies widely by geographic area and subject specialty. Many inner cities — characterized by high crime rates, high poverty rates, and overcrowded conditions — and rural areas — characterized by their remote location and relatively low salaries — have difficulty attracting enough teachers ... Currently, many school districts have difficulty hiring qualified teachers in some subjects — mathematics, science (especially chemistry and physics), bilingual education, and computer science. Specialties that currently have an abundance of qualified teachers include general elementary education, English, art, physical education, and social sciences. (quoted from the *1998-99 Occupational Outlook Handbook*, current Internet release p.178).

The demand for special education teachers is particularly strong due to legislation and government programs "emphasizing training and employment of persons with disabilities, growing concern for individuals with special needs, and education reform". The number of students requiring special education is expected to increase because "medical advances will result in more survivors of accidents and illness; (and) the postponement of childbirth by more women ... (will) result in a greater number of premature births and children born with birth defects" (p.181).

There is also a notable demand for teachers from minority and Hispanic populations.

The following factors are driving the demand for teachers in the United States:

- increasing primary and secondary student enrolments, creating a need for 58,000 teachers per year
- retirements of experienced teachers, that, in some cases, is accelerated by early retirement programs
- occupational mobility due to attractive alternative employment in other sectors, which are benefitting from the prosperous United States economy

Replacement demand due to retirements and occupational mobility is projected to be 65,000 annually, a rate only slightly higher than that for other occupations.

The supply of teachers in the United States is increasing, as evident by a growing number of graduates from teacher education programs, and there is 'keen' competition from qualified job seekers for high-paying teaching jobs in desirable locations. There are as many as 500 institutions offering teacher education in the United States, and they have the capacity to train an increasing number of new teachers.

The following articles mirror and expand upon the Bureau of Labour Statistics assessment summarized above. They also reflect coping techniques where teacher shortages occur.

"Initiative to Attract & Prepare Tomorrow's Teachers", United States Department of Education Internet release, July 1997: announces a Presidential initiative to provide scholarships to teacher education program students who commit to teach in 'under-served' urban or rural schools for at least three years. This proposal "will help recruit nearly 35,000 teachers over five years, meeting 10% of the need for new teachers in high poverty urban and rural communities". In addition, grants will be made to 10 to 15 "lighthouse" teacher education institutions to assist other institutions improve their teacher preparation programs. The announcement states that in urban districts 50% of teachers leave the profession in the first five years.

"Teacher Turnover and Teacher Quality: The Recurring Myth of Teacher Shortages", Teachers College Record, Fall 1997: argues that the teacher shortage in the United States is really one of a mismatch of teacher qualifications and the subjects that they teach, i.e., 54% of the secondary students taking History are in classes where the teacher has neither an academic major nor minor in History; a similar statistic for physical sciences is 41%. A major reason that educational administrators must resort to hiring 'out-of-field' teachers is a high turnover of experienced teachers who are dissatisfied because of low salary, problems with student discipline, and lack of input into school decision-making.

"A 'Real' Teacher Shortage", Phi Delta Kappan, November 1998: catalogues a number of actions that states and localities are taking to fill teaching positions, such as

- California
 - More than 29,000 teachers are teaching with emergency certifications, issued to individuals with university degrees but lacking teaching credentials.
 - The state university system is working to shorten the teacher education program from two years to one year of course work.
 - The 'loan forgiveness program' is being expanded for new teachers of math and science (and maybe other subjects) who are willing to teach in inner-city or rural areas.
- Maryland
 - Prince George's County offered teachers free rent for a month and low interest loans. Only 57% of the 1,300 newly hired teachers were fully certified in their teaching areas.
 - Howard County and Frederick County offered tuition reimbursement to new teachers to take graduate and/or undergraduate study.
 - Baltimore offered reduced rate mortgages and low-interest loans for relocation expenses. Special education teachers were moved up the salary schedule the equivalent of four years of teaching.
- New York City
 - Recruited 23 Science and Math teachers from Austria.

- Texas
 - Dallas and Fort Worth offered signing bonuses to new teachers of \$500 to \$2,000.
 - El Paso gave new Math teachers a \$2,000 bonus.
- Massachusetts
 - Has enacted legislation offering a \$20,000 signing bonus for the most promising 200 teachers who agree to teach in the state next year.
- Kentucky
 - Some school districts have received State permission to employ people with a high school diploma to substitute teach.

These reports and articles do not indicate a systemic shortage of teachers in the United States, but there are regions and subjects where shortages exist. With a current surplus of teachers, Canada, would appear to be fruitful ground for recruiters from United States school districts, however, many of the vacant teaching positions in the United States appear to be relatively undesirable. It is not likely that a significant number of graduates from Canadian teacher education programs would be lured to teach in the United States so long as suitable teaching employment were available here.

3. BACKGROUND

3.1 Scope of the Nova Scotia Labour Market for Teachers

Elementary and secondary public education is one of Nova Scotia's largest industries, currently employing nearly 17,500 persons in various occupations, who comprise 4.3% of the province's employed workforce. Public education enrolment is 162,000 students, which represents 17% of Nova Scotia's population.

Public education is labour intensive, with approximately 85% of its \$725 million in annual expenditures in Nova Scotia devoted to wages and salaries. The largest component of employment is teachers, totaling approximately 12,650 persons, consisting of 11,500 classroom and specialty teachers and 1,150 teacher-certified education administrators — ranging from superintendents to school department heads¹. This study focuses on the demand and supply for teachers including teacher-certified administrators.

Operating in a total of 472 school locations, public education is geographically and linguistically diverse within Nova Scotia. There are six regional school boards which deliver public education in English within their respective geographic domains, and there is one school board, Conseil scolaire acadien provincial (CSAP), which is responsible for delivering French language public education province-wide. Each board is a distinct employer, and is responsible for its own labour relations, given the teacher certification requirements established by the Department of Education, and the

¹These estimates include substitute teachers and individuals on leave. Note: the numbers in this paper may differ from those published in the Department of Education *Statistical Summary*. The *Statistical Summary* is based on data as of September 30, whereas this paper utilizes full-year data.

Teachers' Provincial Agreement negotiated by the Department and the NSTU. The boards are also subject to board-negotiated sub-agreements with the NSTU dealing with local working conditions.

Not included in this study is consideration of teachers employed by the 32 private elementary and secondary schools in Nova Scotia. Fewer than 200 teachers are employed in private schools.

Although teachers at private schools are participants in the labour market for teachers, their presence is not a substantial factor. Also excluded from consideration are community college teachers. Effective in the fall of 1998 teacher certification was no longer required for community college teacher employment.

3.2 Perspective on the North American Labour Market for Teachers

The delivery structure of public education in Nova Scotia is similar to that elsewhere in Canada and the United States. In some respects the market for teachers is North American, where there exist comparable qualification requirements and there is frequently commensurate remuneration. Traditionally, a teacher was tied to a local labour market by a reluctance to move to another provincial region, province, or country. It is evident that the mobility of teachers is increasing, especially for new entrants. Thus, conditions of supply and demand outside of Nova Scotia have a bearing on the provincial labour market. Teachers residing outside of the province represent a potential source of supply for the local labour market. Likewise, the requirements of boards elsewhere represent a competing demand for the supply of teachers in Nova Scotia.

As is evident from the figures below, Nova Scotia represents a very small component of the larger Canadian and North American labour market for teachers.

Figure 3. Nova Scotia Teachers in the North America Labour Market

Jurisdiction	Teachers *	Nova Scotia % Share
Nova Scotia (a)	12,375	100.0%
Canada (a)	413,595	3.0%
United States (b)	3,053,000	-

* employment according to principle occupation. Teachers include guidance counselors.

(a) employment in 1996, Census of Canada

(b) employment in 1996, *Occupational Outlook Quarterly*, Spring 1998, United States Bureau of Labour Statistics

3.3 Historical Situation of the Nova Scotia Labour Market for Teachers

Since the early 1970s the labour market for teachers in Nova Scotia has been characterized by oversupply. This was apparent in the large number of teaching certifications that were being issued by the Department of Education compared to the number of employment opportunities for teachers. From 1992 through 1998 5,558 individuals were certified by the Department of Education, but by 1998 only 1,884 (34%) remained employed as teachers, even as substitutes, in public education in Nova Scotia. In recent years there has been an increasing proportion of individuals acquiring teacher certification who obtained teaching employment in the province, but there are still more newly certified teachers than apparent employment opportunities. For example, only 67% of the

newly certified individuals in 1997 were able to obtain any public school teaching employment in Nova Scotia in either 1997 or 1998.

Even when teacher oversupply was most evident, the school boards would occasionally report difficulties hiring teachers in specific subject areas, (e.g., Mathematics and Sciences), in various regions of the province.

Reorganization of Teacher Education Programs in Nova Scotia

In 1994 the Nova Scotia Council on Higher Education, and the Department of Education, initiated a reorganization and rationalization of the university and college teacher education programs operating in the province. The impetus for change was twofold. The first was to establish consistency in teacher education programs concerning academic year and content. As a result, the principle was accepted that teacher education would occur subsequent to a baccalaureate degree in a university academic subject. The second was to limit the enrolment in teacher education programs to avoid undue commitment of the universities' scarce resources given the oversupply of teachers. The number of Nova Scotia institutions conferring Bachelor of Education degrees was reduced from seven to four: Acadia University, Mount Saint Vincent University, St. Francis Xavier University for English speaking teachers, and Université Saint-Anne for French speaking teachers. The annual number of students obtaining undergraduate education qualifications was reduced from nearly 900 to a target of between 300 and 350. The outlook then was that: "... the [annual] production of graduates at a level of 300-350 would meet the forecast needs until the turn of the century" ("Reshaping Teacher Education in Nova Scotia", Nova Scotia Council on Higher Education, March 1994, page 9). The current target for graduations from education training programs is approximately 400 per year.

Included in the reorganization of teacher education was the recommendation that the number of years of study required for a Bachelor of Education degree be increased from one to two years at all four institutions. Acadia University already had a two-year program. Mount Saint Vincent and the Université Saint-Anne converted to a two-year program for students entering in the fall of 1994, and St. Francis Xavier University converted in the fall of 1996. Students already enrolled in various education programs, some lasting as long as four years for integrated subject and education courses, were allowed to complete their studies. The net impact of the generally longer program duration was to reduce the number of students attaining a degree in the transition year. Information on the number of teacher certifications issued indicates that the effect of the transition peaked in 1996 when the number of new certifications declined by 180 (- 30%) compared to the average of the previous four years.

The role of teacher education institutions as a provincial source of supply of teachers is discussed further in the Supply section of this study.

Teacher Early Retirement Incentive Program

In 1994 the school boards in conjunction with the Department of Education implemented a four year Early Retirement Initiative Program for teachers. The objective was to reduce the number of teachers in response to declining enrolments through accelerating retirements rather than lay-offs. Retirement eligibility was extended by lowering the combined years of service and age criteria from 85 to 82 years, subject to a minimum age of 50. It was recommended that the boards limit hiring to three new teachers for every four taking early retirement in order to fund the early retirement program. A

total of 2,184 teachers retired under the program, which ended in July 1999. An intended by-product of the program was a temporary increase in the number of new, regular teachers hired by the boards during the five year period.

3.4 Certification Qualification of Teachers

As a prerequisite for employment in public education every teacher, regular and substitute, must be certified by the Department of Education. Current certification standards require a teacher to have an approved bachelor's degree and at least one year of university teacher education. Minimum certification is designated as a Class 5 and the highest is Class 8. A teacher is classified within this range according to his/her level of formal advanced academic and professional training. At present, there is no certification distinction or endosration concerning the subjects or grade levels in which a teacher may practice.

Once certified, an individual is qualified to teach in public education in Nova Scotia without time limit. Certificates are now issued without expiration date. Prior to November 1992, however, an individual was certified initially for three years and would become permanent if in the period she or he was engaged as a permanent teacher for two years. Otherwise, the individual would need to apply for perfunctory renewal. Some former certificate holders who did not actively participate in the teacher labour market after 1992 may not be aware that their certification can be renewed, upon application, on a permanent basis.

As a matter of course, new graduates of Nova Scotia teacher education programs who anticipate a career in teaching, either in the province or elsewhere, obtain a Nova Scotia Teaching Certificate. In many instances, the certificate is issued at the time of graduation. Nova Scotia teaching certification is also awarded, upon application, to qualifying individuals who move to the province and wish to teach here.

The annual number of new teacher certifications issued is a measure of the incremental supply of teachers. This aspect is analyzed in the Supply section of this study.

3.5 Employment Status of the Teacher Workforce

The teacher workforce in Nova Scotia consists of several components which have differing employment status, and concomitant labour market commitment, as follows²:

- **Permanent Teachers**, approximately 8,100, are regular employees of the school boards, and are protected for job security by 'placement' rights set forth in the Teachers' Provincial Agreement. Placement priority is based on length of service with the employing board. Approximately 250 permanent teachers work part-time.
- **Probationary Teachers**, approximately 350, are regular employees of the school boards who are serving a two-year probationary period before becoming permanent teachers.
- **Term Teachers**, approximately 1,500, are hired by the school boards for fixed, specific, durations.

² Note the indicated numbers of teachers do not include teachers on leave, which totals to approximately 500.

- **Substitute Teachers**, approximately 2,200, are engaged by the school boards for short-term, often daily, assignments to fill in for absences of 'regular' teachers, caused by short-term illness, other personal short-term leave, and professional development days. The number of substitute teachers overstates their labour input contribution to the education process, because substitutes teach an average of only 52 days (median of 39 days) during the 195 day school year.

The approximate employment levels of teachers by status (1997-1998) by school board are presented in Tables 1A and 1B in the Appendix. Also indicated are comparative operational parameters of enrolment, student to teacher ratios, and average school size according to number of teachers and number of students.

Within recent years there has been a shift in the employment of teachers by status, resulting in a increasing number of term teachers and a decreasing number of both permanent/probationary and substitute teachers. The extent of this shift is evident in the comparative numbers for the 1992-93 and 1997-98 school years.

Figure 4. Number of Teachers by Employment Status 1992-93 and 1997-98

Active Teachers	1992-93	1997-98
Permanent/Probationary	9,632	8,486
Term	803	1,484
Substitute	2,489	2,167
	12,924	12,137

At least in part, the increasing number of term teachers can be attributed to the Early Retirement Incentive Program that has resulted in more teacher retirements during the school year, thus generating a need for term teachers to fill in for the balance of the school year. With the end of the Early Retirement Incentive Program the number of term teachers should decline, with an equivalent increase in the number of permanent/probationary teachers.

Nearly all permanent teachers enter the profession as substitutes, however, there is only a tenuous career path leading from substitute to permanent teacher status. Based on transitions between the 1996-97 and 1997-98 school year, of the 2,339 substitute teachers employed in 1996-97 in the following year

- 25% did not continue teaching in Nova Scotia public education
- 54% remained employed as substitute teachers
- 19% became term teachers
- 1% became permanent/probationary teachers

There is also a relatively weak career path from term to permanent/probationary status. Only 15% of the term teachers employed in 1996-97 attained permanent/probationary status in 1997-98.

As a result, the chance of a substitute teacher being employed as a permanent/probationary teacher within two years is roughly 5%³. The issue of occupational attrition of substitute teachers is discussed in the Supply section of this study.

3.6 Remuneration of Teachers

Remuneration of teachers is governed by the Teachers' Provincial Agreement, that specifies annual salary levels for permanent, probationary, and term teachers, which range from \$31,135 (TC5) to \$62,197 (TC8), according a teacher's respective level of certification and years of service. As a group permanent, probationary, and term teachers are referred to as 'regular' teachers in the Teachers' Provincial Agreement. The work-year for a regular teacher is 195 days. There is a premium for education administrators that varies with the number of teachers supervised. For example, the added remuneration for a full-time principal in a school with 20 teachers is \$7,937 per year and \$13,307 in a school with 50 teachers.

The payment of substitute teachers is determined in part by their days of consecutive employment at an assignment with a board. Generally, substitute teachers are paid \$107 per day (\$109 as of August 1, 1999). At this rate the maximum remuneration for a substitute teacher would be \$20,865 (\$21,255 as August 1, 1999), assuming the availability of work for 195 days. Given that substitute teachers averaged only 52 days of substitute work in 1997-98, the average earnings of substitute teachers that year would have been \$5,564. If a substitute teacher replaces a regular teacher for 30 consecutive days in a school year the rate of pay increases to \$135 per day. Further, if a substitute teacher replaces a regular teacher for 74 consecutive days (64 days as of August 1, 1999) then his/her remuneration is generally escalated to the regular teacher pay scale. In 1997-98 only 39 substitute teachers were eligible for the regular teacher pay scale.

Prior to August 1, 1994, the basic per diem remuneration of substitute teachers was pro-rated at 75% of the salary schedule for regular teachers. Per diems then ranged from \$113 to \$227 (\$22,035 to \$44,265 for 195 days), depending on the certification classification and years of experience of the substitute teacher.

The current standard of remuneration for regular teachers (permanent, probationary, and term) is favourable when compared to wages and salaries in other sectors. For example, in the 1997-98 school year the average salary of regular teachers in Nova Scotia was \$49,246, which was approximately 50% higher than the average annual earnings of full-time, full year workers of \$32,000 (*Earnings of men and women*, Statistics Canada, 13-217-X1B, 1997). At the same time, however, the earnings prospects of substitute teachers were significantly below average earnings in other sectors.

³This likelihood takes into account the sum of the probabilities of the two paths by which a substitute teacher can attain permanent/probationary status:

- in any year, there is 1% probability of a substitute teacher directly attaining permanent/probationary employment in the next year. Over 2 years this would amount to approximately 2%, and
- in a 2-year period there is an approximate 3% probability of a substitute teacher first becoming a term teacher then in the following year going from term to permanent/probationary teacher. The mutual probability of this chain of events is 19% (the independent probability of a substitute teacher becoming a term teacher) times 15% (the independent probability of a term teacher becoming a permanent/probationary teacher), which equals 2.85%.

3.7 Labour Market for Teachers by Subject Area

The Nova Scotia labour market for teachers is differentiated by subject. This is a practical consideration, not a requirement of teacher certification or endorsement, given the tendency of teachers to seek positions in those subjects where they have previous academic qualifications or experience. School boards apply subject and experience criteria when evaluating which teachers should teach specific subjects. Even so, research conducted by the Department regarding teacher certification policy indicates that at the secondary education level there is a notable incidence of teachers teaching outside of their university major or minor.

Delineation of the teacher labour market by subject is complicated by two factors.

- The Public School Programs, prescribed by the Department of Education to be delivered to students in Nova Scotia, provides curriculum for hundreds of subject titles. Grade level is a distinction for many of these; in terms of content many of the titles overlap.
- The majority of teachers (55%) teach multiple subjects, although often the subjects have similar content.

For purposes of this study the labour market for teachers in Nova Scotia is considered to have 14 subject segments, as indicated in Table 2 (See Appendix A). The grouping of subjects into segments is based on the respective underlying approaches to critical thinking and understanding of relationships. Thus, (foreign) Languages, where the abstract concept of language structure and linguistic ability are important, is a different labour market segment than Science where thinking involves the methods of scientific inquiry as it relates to physical and biological phenomena. A teacher adept in one subject within a segment would likely have a proclivity to teach in the others. Often this occurs because of a post-secondary academic background which encompasses some or all of the subjects in a segment. Elementary school instruction is a segment in itself, requiring teachers to have a broad understanding of many subjects, but with particular knowledge of the methods of instruction most applicable to young students.

Administration is also included as a segment of the teacher labour market because there is frequent migration of classroom teachers to education administration and vice versa; teachers often have combined teaching and administrative assignments. Education administrators are required to have teacher certification. Further, certified administrators are represented by the NSTU for collective bargaining.

There is no subject distinction for teachers able to deliver instruction in French versus English. This is implicit in that teachers employed by CSAP must be able to provide instruction in French. For the six other boards the language of instruction is predominantly English, with the exception of French Immersion.

3.8 Changing Curriculum Emphasis

Over time there has been a succession of changes in the subjects taught and the emphasis afforded them. These factors can have a bearing on the requirement for teachers, especially for the subjects affected. School boards have some leeway in the programs they offer in their schools or the instructional design of local courses and can formulate educational programs for students with special needs. The majority of public education instruction, however, adheres to the "Public School Programs" (PSP), which is prescribed and periodically revised by the Department of Education. For the purpose of examining the demand and supply for teachers, the significant changes in the PSP, subsequent to the 1992-93 school year, are summarized in the discussion below. Also included is the outlook for major changes that may occur in the future.

Elementary School Program (Primary through Grade 6)

The PSP specification of the elementary school program has been changed to provide teachers more flexibility with regard to teaching compulsory subjects. There is an English and French language requirement, which has remained constant. In English speaking elementary schools French is compulsory beginning in grade 4. English is compulsory in Acadian and Francophone elementary schools beginning in grade 3. Prior to the 1993-94 school year, the PSP recommended the percentage of instruction time by grade level for the subjects of Art, Health, Language Arts, Mathematics, Music, Physical Education, Science, and Social Studies. Starting with the 1993-94 PSP, these subjects continue to be required but the percentages of instruction time were no longer indicated. The 1996-97 PSP refers to the need for flexibility in required subject schedules to allow teachers to take advantage of "natural" learning opportunities.

On balance, the changes in elementary school curriculum have not significantly altered the labour market for elementary school teachers.

Junior High School (Grades 7 through 9)

The PSP specifies compulsory and elective courses to be taken in junior high school grades 7, 8 and 9. Compulsory courses include Language Arts, Mathematics, Science, Social Studies, Personal Development and Relationships, and Physical Education. With the exception of French, or English for French speaking schools, the compulsory courses have not changed. The introduction of compulsory French, or English, is being implemented in the junior high school grades according to the following schedule:

Figure 5. Years for Institution of Compulsory Second Language Course

School Year	Compulsory French/English
1997-98	Grade 7
1998-99	Grade 8
1999-00	Grade 9

Note that where Gaelic or Mi'Kmaq language instruction are offered they can be substituted for the French/English requirement.

The labour market impact of French or English becoming compulsory in the PSP has been minimal because nearly all students were already taking the subject as an elective. For example, the number of students taking grade 7 Core French increased by only 104 students (from 9,435 in 1996-97 to 9,539 in 1997-98) when grade 7 French became mandatory. Likewise, the introduction of compulsory Core French in grade 8 realized an increase of only 210 students. Nearly all grade 9 students in English speaking schools are now taking French as an elective, even though the subject does not become compulsory for this grade until the 1999-2000 school year.

High School (Grades 10 through 12)

The high school PSP has undergone the most change in terms of instructional time required and program requirements. Since the 1992-93 school year, the minimum number of credits required for high school graduation has increased from 16 to 18, the number of compulsory subject credits has increased from 6 to 13, and the number of minimum scheduled instructional hours per credit has decreased from 120 to 110. The timing of these changes is shown below.

Figure 6. Increase in Minimum Credits, Subjects and Instruction Hours Needed for High School Graduation

School Min. Credits		Credits in	
		Compulsory	Scheduled Hrs.
Year	to Graduate	Subjects	per Credit
1992-93	16	6	120
1993-94	17	7	120
1994-95	17	7	120
1995-96	17	7	120
1996-97	18	8	110
1997-98	18	13	110
1998-99	18	13	110

The effect of increasing the minimum number of graduation credits and the number of compulsory credits initially applies to students entering grade 10 in the school year of the change. Therefore, there is a delay of three years before the full effect of these changes is felt. The full impact of increasing the number of compulsory subject credits to 13 will not occur until the 1999-2000 school year.

Compulsory credit requirements for students entering grade 10 in the 1992-93 school year consisted of 3 credits in English (French in a French speaking school), 1 credit in Mathematics, 1 credit in Social Studies, and 1 credit in Science. Thereafter, the additional number of compulsory credits were in the following subjects.

Figure 7. Changes to Compulsory Subject Credits by Year

1993-94	1 credit in global studies (Geography, History)
1996-97	$\frac{1}{2}$ credit in Career and Life Management $\frac{1}{2}$ credit in Physically Active Lifestyles
1997-98	1 credit in Mathematics 1 credit in Science 2 credits in Mathematics, Science, and/or Technology (Computer related studies, Data Processing, Industrial Arts Technology, and Word/Information Processing)

Table 3 in Appendix A contains information on high school enrolments for the subjects where the number of compulsory credits has increased. Overall, the increase in the number of credits needed for graduation does not appear to have had a major impact on enrolment or teaching effort. This may be due to the fact that when the number of credits were increased many students were already taking more than the minimum. Likewise, enrolment in courses where compulsory requirements

were added (or augmented) has remained relatively stable, because enrolment in these courses was already relatively high. As noted above, it remains to be seen what the full impact of the changes for 1997-98 will be. Generally, however, the labour market impact of the changes in high school curriculum requirements has not been major.

The exception to this conclusion appears to be that the addition of two new compulsory half-credits for Career and Life Management and Physical Life Styles, in 1996-97 has had a major impact on the enrolments in Personal Development. From very small enrolments prior to and in 1995-96 enrolment increased to 11,000 students in 1996-97 and nearly doubled to 20,500 in 1997-98. There was a commensurate increase in teaching allocation, growing from approximately 1 FTE in 1995-96 to 43 FTEs in 1996-97 and 78 FTEs in 1997-98. As a consequence, FTEs were moved from other fields of study/subject areas. When faced with the need to expand teaching FTEs in compulsory areas, a school will typically reassign teachers from elective subjects.

Given that the length of a teacher's working day and the number of days of instruction in a year have not changed, the impact of reducing the number of scheduled hours per credit, from 120 to 110, had the potential of increasing high school teacher productivity by an average of 9% in terms of the number of credits each could teach. In 1996-97 many high schools changed their schedules to adjust to the reduced number of hours per credit. As indicated in Table 3, however, the potential for increased teacher productivity is not significantly reflected in either a reduction in teacher FTEs or a reduction in average class size. Instead, it appears that the lower time for classroom instruction was, in part, offset by an increase in non-classroom instructional and counseling activity.

Outlook for Changes in Curriculum Content and Delivery

The Department of Education, in collaboration with the school boards, is continually reviewing opportunities to improve the delivery and contemporary relevance of the curriculum offered in public schools. Developing and implementing curriculum changes necessitates a number of phases and is time-consuming. An opportunity or need for curriculum change must be identified, a new course or delivery strategy must be defined, the change must be piloted in controlled classroom conditions with subsequent modifications, and then the change must be introduced to other schools. Changes can involve new teaching modes such as team and interdisciplinary teaching, and the use of computers for on-line information sources, tutorials, and simulation. Promulgating changes in the public education system can entail significant effort, requiring acceptance of the concept by a potentially large number of teachers, teacher education, re-scheduling of teacher work loads, adjusting class schedules, and acquiring new learning texts and lab equipment and materials. The current outlook for the effect of future changes in curriculum on teaching effort is summarized below by grade level.

Elementary School subject coverage will be relatively stable, but there will be innovations in delivery. One such example is the Reading Recovery program, which has proved effective in overcoming early reader difficulties through specialized instruction. In general, primary and elementary grade students require more differentiated instruction, where smaller class size is an advantage.

Junior High School subjects will remain stable, but there will be changes in subject content and delivery through more team and interdisciplinary teaching.

High School curriculum is undergoing a broad range of change as a result of a multi-year development effort. The Atlantic Provinces Core Course Curriculum Initiative, under the auspices of the Atlantic Provinces Education Foundation, is revising course content and delivery in subject areas such as English Language Arts, French Language Arts, Social Studies, Mathematics, and Science. Further, there are Nova Scotia initiatives relating to

Fine Arts, Physical Education, and Entrepreneurship. As part of the provincial initiative there are a number of multidisciplinary courses being implemented as shown below.

Figure 8. Year of Introduction of New High School Courses

New Courses	Year of Initial Implementation
Oceans	1998-99
Tourism	1998-99
Cultural Industries	1998-99
Life/Work Transition	1999-2000
Design	1999-2000
Film and Video Production	2000-01
Electro-technologies	1999-2000
Gaelic Cultural Studies	2000-01
Agriculture/Foods	2000-01
Multimedia	TBA
Sound Recording/Sound Technology	TBA

It is not expected that the new course offerings and delivery methodologies will have a significant impact on the high school student to teacher ratio. Further, the current outlook is for the minimum number of credits required for high school graduation to remain at 18. The number of hours per credit, will not change from 110.

For public education in general, as new curriculum and methods are implemented, teachers will require significant opportunities for professional development and implementation planning. This will likely lead to a small increase in the need for substitute teachers. Indeed, the unavailability of temporary and substitute teachers might limit the pace at which curriculum change can occur.

Impact of Computer Technology on Instruction

The Province of Nova Scotia is supporting initiatives to significantly increase the number of microcomputer systems available in schools for instruction. These initiatives are in addition to school board and school activities in this regard. In March 1996 the following numbers of current-technology microcomputer systems were available for use by students.

Figure 9. Number of Microcomputers Available and Per Student 1996

Grade Level	Number of Microcomputers	Students per Microcomputer
Primary to 6	2,028	42
7 to 9	1,932	20
10 to 12	2,989	13

The goal of the Department of Education is to attain a student-per-microcomputer ratio of 5:1 in the year 2005. This would require the acquisition of approximately 22,000 new microcomputers plus on-going replacement of units as they become obsolete.

The acquisition of computers is occurring by means of several Department initiatives.

- New schools will be fully equipped with modern computer systems, for a ratio of approximately 4 students per microcomputer. Since 1996, 10 'technology rich' schools have been constructed, and, as noted in the next section, 36 additional schools will be completed by the 2000-01 school year.
- Major renovation projects for schools include a significant technological component for upgrading microcomputer system capability. Since 1996, 6 renovation projects have occurred and another 57 are scheduled to be carried out.
- The Junior High School Technology project, through which 800 microcomputer systems were acquired and installed in 46 junior high schools in 1996-97.
- The Technology Recycling Program, operated by the Department in conjunction with Nova Knowledge, a consortium of private sector, government, and education organizations that renovates and recycles used computer systems to schools. Since 1984, the Technology Recycling Program has placed 7,500 microcomputers in schools, and is currently providing 2,000 units annually.
- Commencing in 1998-99, the Information Economy Initiative, administered by the Department with funding from the federal and provincial governments, is committed to spending \$6 million annually on the acquisition of instructional computer systems, technical support services, and technology-related teacher professional development. The result of the first year of operation will be the addition of 6,000 instructional microcomputer systems in high schools by December 2000. Another significant accomplishment will be to connect all public schools in Nova Scotia to the Internet.

The effect of the increased availability of instructional computer systems is potentially significant. The computer is a learning tool with many possibilities for students to receive personalized tutoring; conduct research using local and world-wide information sources; simulate mathematic, scientific and logical relationships; apply and improve writing skills by means of word processing; and through world-wide e-mail promote communications skills and create an awareness of cultures elsewhere. There may also be an opportunity for school boards to conduct distance education, as being piloted by the Strait Regional School board, whereby teachers at one location can deliver instruction to classrooms in more than one school.

Although their impact on teaching approach is expected to be significant, the availability of instructional computers is not seen as having a significant impact on the total requirement for

teachers. Distance education may provide an opportunity to overcome local shortages of teachers in certain subjects, but implementing distance education requires additional technologies and differing teaching methodologies. Perhaps the most significant impact will be a need for more substitute teachers to replace, on a short-term basis, regular teachers who undertake professional development to learn how to make the best use of newly available technology. Professional development is formally included in new school projects, many of the projects for school renovations, and in the Information Economy Initiative. Regarding the latter, three days of professional development is anticipated to take place by March 2001 for all high school teachers. However, the increased availability and use of technology will generally result in a significant requirement for further professional development.

3.9 Changes in Class Size

Class size is a factor in the quality of education that can be delivered. Within limits, smaller class size allows teachers to better attend to the individual learning requirements of students. A common goal of the Department of Education and the school boards is to reduce average class size. Consultation involving Regional Class Size Action Committees, which included representation from the school boards and the NSTU, resulted in the target average or maximum class sizes shown in Table 4. In the case of CSAP, which already tends to have small classes, there would be an increase in average class size for all but the primary to grade 3 classes.

Any reduction in class size, all things being equal, will have a proportionate increase in the demand for teachers. The provincial government has proposed cost-shared funding that would underwrite the employment of an additional 77 teachers starting in 1998-99, with emphasis on reducing class size in grades primary through 6. This represents a 1.5% increase in the number of regular elementary teachers, and 0.8% overall. This increase is not sufficient to achieve the targeted reduction in class sizes, and the prospect of additional funding is not known. For the purpose of estimating the future demand for teachers, this study does not anticipate that there will be any further increase in the number of teachers to reduce class size beyond the 77 already committed.

New School Construction

Enhancing the prospects of lowering class sizes is a substantial new school construction program that is underway in Nova Scotia. The Nova Scotia government is committed to building 39 new schools for operation by the school boards by 2000-01. Sixteen more schools have been approved and are scheduled for delivery by 2003-04. Government is currently conducting a cost-benefit analysis of the public-private partnership program used to finance the first 39 schools.

The outcome of the cost-benefit analysis will help government determine how to proceed with the school construction program. The new schools will add to classroom capacity, but with fewer schools. A major objective of the new school construction is to consolidate and rationalize smaller and outdated schools. This will result in a more even balance in classroom size, greater selection of subjects, and more effective use of teachers and administrators.

3.10 Trend in Student Enrolment

The number of students enroled is a fundamental determinant to the quantity of public education to be delivered. The current downward trends in enrolment are a reflection of the waning number of grandchildren of the 'baby boomers' born in the two decades following World War II. These trends are similar elsewhere in Canada and the United States. Over time, local factors have also played

an important role in determining regional demographic distributions. They include international immigration and emigration, interprovincial migration, and intraprovincial migration at the school board level.

Table 5 contains 1992-93 and 1998-99 school year enrolments for Nova Scotia by grade level, and totals for each board. (Note, school boards were reorganized into their present configuration in 1995, and prior school board enrolment statistics are not available.) Also indicated are corresponding projections for 2004-05 and 2009-10. The projections are based on Statistics Canada data on actual births by county and forecast number of births for the province. In applying these projections to the province and school board regions it is assumed that:

- fertility rates by region are stable in the forecast period
- international immigration/emigration, interprovincial migration, and interregional migration will, on balance, be neutral amongst the regions
- the pattern of school participation of children remains stable

Migration, in particular, is influenced by relative economic opportunities between provinces and regions. These assumptions may or may not be realistic depending on the future relative prosperity of Nova Scotia with respect to Canada, and the regions within Nova Scotia with respect to each other.

The trend of declining enrolments in Nova Scotia is evident throughout the 1992-93 to 1998-99 period, with an average annual decrease of 0.6%. The rate of decrease is anticipated to accelerate in 1998-99 to 2003-04, with a projected average annual decline of 1.1%. The decrease in elementary grade students is expected to be relatively more pronounced, at -1.7% per year. Further acceleration of the decline in enrolments is projected in the 2003-04 to 2009-10 period, decreasing by 1.5% per year for all grades. Here the most significant decrease is foreseen in the junior high (-2.5%) and high school (-1.5%) grade levels.

All boards are projected to experience declines in enrolment, except CSAP where enrolment will not change significantly. Cape Breton – Victoria and the Strait Boards are forecast to have the most significant decreases in enrolment, each losing 15% between 1998-99 and 2003-04 and 14% and 17% respectively between 2003-04 and 2009-10 respectively.

In the absence of offsetting factors such as smaller class sizes, the declining trend in enrolments has and will result in a proportionate decrease in the requirement for teachers.

3.11 Attrition of the Teacher Workforce

The most important factor in the demand for regular teachers has and will be attrition. That is teachers leaving employment in Nova Scotia public education due to

- scheduled retirement with pension
- disability retirement with pension
- work in other jurisdictions or sectors, or leaving the labour force — referred to collectively as occupational mobility
- death while employed

As discussed below, the most significant of these is retirement where about 54% of the current teaching workforce will be eligible to retire before or by the 2009-10 school year.

There is also temporary attrition where teachers remain employees of the school board but withdraw from work for a period to take leave for maternity/paternity, sabbatical, or extended illness.

The attrition of substitute teachers is a special situation relating to the retention of new entrants to public education in the province and is discussed in the Supply section of this study in the context of a leakage from the supply of new teachers.

Table 6 presents annual data on attrition in (or at the end of) the 1993-94 to 1997-98 school years and projected (permanent) attrition to 2009-10. Historical data for occupational mobility are estimated on the basis of the number of regular teachers who did not continue employment (not even as substitutes) and who did not retire, go on disability pension, or die.

Teacher Retirements

The impact of the Early Retirement Incentive Program was especially evident for teachers employed during the 1993-94 school year, when the four year program was introduced. A total of 918 teachers retired in the first year, 643 of them taking advantage of early retirement. The timing of the majority of retirements through 2001-02 continues to reflect the influence of the early retirement program. The number of teachers retiring will be low: 120, 62, and 209 respectively, in 1989-99, 1999-2000, 2000-01. Thereafter, the number of teachers eligible to retire ranges from 477 in 2001-02 to 671 in 2005-06. The projections of retirement assume that all regular teachers will continue to work in the provincial public education sector until they are eligible for a pension, and once eligible, they will all retire. These assumptions have been reasonably born out by experience.

Disability Pension

A disability pension is available to teachers who can no longer work because of disability caused by accident or illness. In most instances a disability pension is permanent. The number of teachers initially receiving a disability pension per year is low. In the period of 1993-94 through 1997-98 the number of teachers starting on disability pension in a year ranged from none to a high of 30, with an average of 16 per year. The incidence of teachers commencing disability pensions is apparently haphazard but small. For purposes of the teacher labour market demand projections in this study, the number of teachers leaving employment with disability pensions is assumed to occur at the rate of 20 per year for the school year period from 1998-99 through to 2009-10.

Deceased

The number of teachers who die while actively employed in public education in Nova Scotia is very small, ranging from 5 to 18 per year in the period starting in 1993-94 through 1997-98, and averaging 11 annually. The number of teacher deaths per year is unpredictable but can be projected to be small. Ten deaths are assumed to occur each year for purposes of the teacher demand projections in this study.

Occupational Mobility

In recent years annual occupational mobility for the Nova Scotia Public education sector has ranged from a low of 94 in 1993-94 to 133 in 1996-97, as indicated in Table 6. The average for the five year period from 1993-94 through 1997-98 was 113 per year, which represents 1.1% of the regular teacher workforce. There are a number of factors that could cause a regular teacher to migrate from employment in Nova Scotia public education. These include job dissatisfaction, better opportunities in another sector or jurisdiction, accompanying a spouse migrating to another region, and withdrawal from the workforce.

Term teachers as a group have a notably higher rate of occupational mobility, ranging from 3.6% to 6.9% per year from 1993-94 through 1997-98. As noted in the figure below, with the sharply increasing number of term teachers, their occupational mobility has become a dominant proportion, representing as many as two-thirds of all regular teachers who leave Nova Scotia public education. Approximately 40% of the time, on average, term teachers leave because their contracts are not renewed.

Figure 10. Mobility of Term Teachers

	1993-94	1994-95	1995-96	1996-97	1997-98
Total Number of Term Teachers	867	1,078	1,057	1,198	1,492
Term Teachers Leaving N.S. Pub. Ed. - contracts not renewed	31	57	73	66	72
Occupational Mobility of Term Teachers as a % of the Total Occupational Mobility	33%	54%	65%	50%	59%

Overall, there are no trends or causation apparent in the available data on the occupational mobility of teachers. Although an important factor in the attrition of regular teachers, it is not possible to predict with any precision the future annual number of teachers who will leave Nova Scotia public education. For purposes of the demand projections in this study an annual occupational mobility of 120 teachers per year is assumed, which is in the range of recent experience. (See Table 6).

Temporary Attrition

Temporary attrition refers to teachers who remain employees of the school board but withdraw from work for a period to take leave for maternity/paternity, sabbatical, or extended illness. This form of attrition creates the possibility of term employment to fill in while a permanent or probationary

teacher is on leave. The factors affecting the number of teachers taking leave include collective bargaining rights pertaining to sabbaticals, deferred pay leave, and long term illness benefits. Also, influential are federal government legislation relating to maternity/paternity leave and related eligibility for employment insurance. So long as the number of teachers on leave remains relatively constant, there is a steady requirement for temporary replacements, and, on balance, there is not any resulting growth or decline in employment. This appears to be the case in recent years, as indicated below.

Figure 11. Number of Regular Teachers on Leave

	1993-94	1994-95	1995-96	1996-97	1997-98
Teachers on Leave	555	481	520	545	510

For purposes of the demand projections of this study, it is assumed that the number of teachers on leave will remain consistent with historical levels, and thus will not be a factor creating greater or reduced employment of teachers.

4. DEMAND FOR TEACHERS IN NOVA SCOTIA

4.1 Overview of the Demand Model

In the context of this study the demand for teachers refers to the number of new teachers who will be required annually by the school boards in Nova Scotia for the 1999-00 through 2009-10 school years. There are two considerations determining the number of additional teachers needed each year

- annual change in the level of employment of teachers, as determined by variations in student population and the ratio of students per teacher. As will be shown, this factor can be positive and negative. Although student population is projected to decline, the ratio of students per teacher may be increasing. The student to teacher ratio is influenced by average class size, which in turn is a function of education policy, average school size, and teacher productivity.
- attrition replacement to compensate for employed teachers who retire or otherwise leave the public school teaching profession in Nova Scotia. Given the age distribution of teachers, with a preponderance of older teachers, retirements will have a dominant impact for the period under consideration. Also significant is the number of teachers leaving public education to work in other occupations and/or other jurisdictions, or leaving the labour force altogether. Long-term disability and mortality have a small impact on attrition.

Projected teacher demand is expressed in terms of full-time equivalents (FTEs), which is a close approximation of the number of actual teachers because of the very low incidence (approximately 2.5%) of part-time employment of regular teachers. Estimates of retirements of teachers and teacher-certified administrators is based on the retirement eligibility of the current teacher workforce, provided by the Teachers' Pension Board. When examining the impact of scheduled retirements in conjunction with the other demand factors, the numbers of individuals and FTEs are treated synonymously.

4.2 Changes In Class Size

As previously discussed and exhibited in Table 4, the Department of Education and the school boards have expressed a desire to significantly reduce class sizes in order to improve teaching effectiveness. Achieving the targeted reduction in class sizes in the time frame indicated would require employing between 1,000 - 2,000 additional teachers by the 2001-02 school year. Reduction in class sizes has the potential for being the foremost influence on the demand for teachers in this period. Funding proposals to date allow for hiring an additional 77 elementary teachers commencing in the 1998-99 school year. For purposes of the projections in this study, it is assumed that there will be no additional growth in the employment of teachers leading to reduced class size. When funding is identified the projected demand for teachers can be modified to reflect the number of additional teachers by grade level by year.

4.3 Summary Results of the Teacher Demand Projections

Nova Scotia projections for teacher demand by year are presented in Table 7. The factors of changing enrolments, disability pension, occupational mobility, and death are shown separately for secondary and elementary grade levels, and for administration. The 'changing enrolment' demand for teacher-certified administrators is assumed to be a function of combined elementary and secondary enrolments. The incidences of disability, occupational mobility, and death for all teachers (including teacher certified administrators), discussed above, are pro-rated according to the number of teachers or administrators in each of the groups.

Declining enrolments will reduce the demand for teachers and administrators by a total of 1,444 FTEs from 1998-99 through 2009-10. This will be offset by a replacement demand of 1,807 FTEs due to occupational mobility, disability or death. The overwhelming demand factor is scheduled retirements, constituting 5,206 individuals. Table 8 provides the number of scheduled retirements by school board by year for the same period. Overall, 5,569 teacher and administrator FTEs will be required during the ten year period, about 95% will be the result of scheduled retirements.

Total teacher and administrator demand in Nova Scotia is relatively low, less than 250, in the years 1998-99 through 2000-01 due to the end and aftermath of the Early Retirement Incentive Program. Annual demand is projected to peak at 705 in 2005-06, after which it declines to 413 in 2009-10.

4.4 Projected Teacher Demand by Subject

An important perspective on the demand for teachers is the subjects qualifications required of new teachers. Presumably, new teachers as a group should have the subject capabilities allowing them to

- replace the teachers who are leaving Nova Scotia public education due to retirement or other attrition elements
- adjust to changing enrolments and class size

Table 9 provides the subject cluster profiles needed of replacement teachers in the six year periods 1998-99 through 2003-04 and 2004-05 and 2009-10. The subject estimates of retirees are determined by the pattern of all of the subjects taught in 1997-98 by teachers who will be retiring in each year through 2009-10. The projected demand by subject for "other demand factors" (indicated in Table 7) is derived on a proportionate basis relative to the overall teaching by subject in 1997-98.

There is a question as to the precision by which the subject projections should be interpreted. Experienced teachers do occasionally change the subjects they teach and there will inevitably be changes in the emphasis of curriculum offered. Also, the subject information for approximately 7% of teachers who will be eligible to retire in the next ten years is incomplete. Many of these teachers were on leave in 1997-98. In the absence of unforeseen major future events, however, the results in Table 9 provide a realistic comparison of the relative importance of subjects in terms of the capabilities needed of new teachers. For example, at the secondary school level, the outlook is for a substantially greater demand for teachers of Social Studies (173 FTEs in 1998-99 to 2003-04 and 164 in 2004-05 through 2009-10) than Business Education Teachers (36 and 31 FTEs in the same periods). The leading secondary subjects areas requiring new teachers in the next decade are first language English, Social Studies, Mathematics, Science, and Family Studies.

Elementary teaching in this study is classified as a subject in itself. The need for elementary school teachers is projected to be 796 FTEs in 1998-99 through 2003-04, and nearly doubling to 1,714 in 2004-05 through 2009-10. There will also be a significant demand for administration positions, estimated to be 294 in 1998-99 through 2003-04 rising to 363 in 2004-05 through 2009-10.

5. SUPPLY OF TEACHERS IN NOVA SCOTIA

5.1 Overview of Teacher Supply

The supply of teachers in this study refers to the annual number of new entrants and re-entrants into the Nova Scotia public education labour force, who are qualified and will likely seek teaching positions with the school boards. Re-entrants are previously eligible entrants who are not employed as teachers in Nova Scotia public education but would accept an available and suitable teaching position. Although most new teachers start their careers as substitutes, the presumption is that individuals seeking teaching positions desire employment as full-time, or occasionally part-time, regular teachers.

The analysis undertaken here does not attempt to allocate supply to region, or school board within the province. This is beyond the scope of this study. Given the likely supply of teachers, it is recognized that each school board will have differing challenges to attract the most qualified teachers.

The primary measure of the annual influx of potential new teachers is the number of teaching certifications issued by the Department of Education. Table 10 shows the number of Type 1 (i.e., classroom, refer to note in the Table) teaching certificates issued according to the location of the recipients' education training institution for the years 1992 through 1998. The trend in the number of certificates issued to graduates of Nova Scotia teacher education institutions reflects the phasing in of the reorganization of teacher education initiated by the Nova Scotia Council on Higher Education in 1994. Included in the reorganization was the conversion of all teacher education programs to two years in duration. By 1998, the effect of the rationalization was complete. The approximate capacity of each training institution, number of graduates in 1999, and the number of applications for the class of 2001 are shown below.

Figure 12. Teacher Education Institution Capacity, Graduation, and Applicants (1999)

English Speaking Teachers	Capacity	Graduates in 1999	Applicants for Class of 2001
Acadia University	120	120	300
Mount Saint Vincent University	120	120	400
St. Francis Xavier University	95	95	300
Total	335	335	
French Speaking Teachers Université Saint-Anne	85	20	20

The teacher education programs for English speaking teachers are fully subscribed, and the large number of students making application for graduation in 2001 suggests that they can continue to operate at, or near, capacity. It should be noted in this regard, that prospective students submit applications to multiple institutions and the apparent demand for training of English speaking teachers is overstated by the total number of the applications received by the three institutions. The Université Saint-Anne, however, is operating significantly below allowed capacity because of a lack of qualified applicants.

An important factor about the number of graduates from Nova Scotia teacher education institutions is that a significant proportion are not residents of Nova Scotia, and likely do not consider the province as their first choice for employment. Historically, about 25% of the graduates of Nova Scotia teacher education institutions receiving Nova Scotia teaching certificates are not residents of Nova Scotia. It is generally required that Bachelor of Education graduates obtain initial certification in the jurisdiction where they receive their professional training, even if they do not intend to teach there. The number of non-residents graduating from Nova Scotia teacher education programs receiving initial certification is indicated in Table 10. For purposes of estimating the supply of teachers in this study, these non-Nova Scotia residents are discounted.

There is a significant number of Nova Scotia teaching certifications issued each year to prospective teachers who received their professional training outside of Nova Scotia. From 1992 through 1988 this number ranged from a low of 211 per year in 1994 to a high of 338 in 1998. There has been an upward trend in this regard that coincides with the decreased opportunity to receive teacher education in Nova Scotia and the conversion of all Nova Scotia teacher education programs to a two year duration. In Canada most jurisdictions have either moved or are moving to two years of professional education for the Bachelor of Education degree. Ontario continues to offer the one year Bachelor of Education program. In the United States, the University of Maine teacher education programs can be completed in 16 months (76 of the 1998 graduates received Nova Scotia teacher certification).

Over 90% of Nova Scotia teaching certificates are issued to individuals who graduated from teacher education programs within the previous two years. However, a small proportion are issued to experienced teachers moving to the province. Many of these would have received teacher education elsewhere, and are grouped with others who have completed training outside the province, in the numbers reported in Table 10, under the heading "Graduates of Institutions Outside

of Nova Scotia." The total number who obtained teaching employment in Nova Scotia between 1993-94 through 1997-98 who had taught the previous year in another province (94) or country (12) was 106.

For the purposes of this study all of the individuals obtaining a Nova Scotia teaching certificate who would have received their professional training outside of the province, regardless of when, are considered to contribute to the provincial supply of teachers. Based on this definition, the annual supply of teachers from 1992 through 1998 is indicated (*in bold*) on the bottom line of Table 10.

5.2 Long Term Supply Outlook in Nova Scotia

The adjustments from the reorganization of teacher education programs in Nova Scotia, which commenced after 1994, appear to be complete by 1998. In the absence of any other major changes, the English and French speaking teacher education institutions should be able to continue graduating approximately 350 qualified new teachers annually. There is the potential for the Université Saint- Anne to increase the number of graduates by as many as 75 per year if it can attract enough qualified applicants. It is estimated that about 70 or 20%, of graduates from teacher education programs in Nova Scotia will likely be students from other jurisdictions whose primary intention is likely to teach outside of the Province.

The Nova Scotia supply is estimated to be augmented by about 300 teachers who graduated from out-of-province training programs. Many of these are resident Nova Scotians who attended teacher training institutions outside of the Province. In the period 1992-98, on average 45% of the Nova Scotia teaching certificates issued to teachers with professional education outside of the Province were graduates of high school in Nova Scotia. From the information at hand there is reason to believe that the out-of-province source of teacher supply will continue as long as the school boards in Nova Scotia remain competitive in the nature of employment and remuneration that they offer and are actively recruiting.

Summarized below is the estimated annual supply of teachers in Nova Scotia:

Figure 13. Estimated Annual Supply of Teachers in Nova Scotia

Source	Number of Prospective Teachers Per Year
Graduates of NS Teacher Education Programs	350
Teachers Trained Out-of-Province	300
(minus graduates of NS programs with out-of-province home address)	<u>-70</u>
Estimated Total Annual Supply of Teachers	580

Comparing the anticipated supply of 580 new teachers into Nova Scotia public education per year with the projected demand for teachers in Table 7, it appears that, in terms of total numbers of demand and supply as defined previously, there would be will be an excess in the annual supply of teachers from 1998-99 through 2002-03. The longer term outlook is for the annual demand for teachers to be greater than the supply in the years 2003-04 through 2006-07, with a peak difference of approximately 120 teachers in 2005-06. From 2007-08 through at least 2009-10 the labour market turns again to excess annual supply. In this context it must be noted, however, that the starting point for the public education labour market in 1997-98 is one of oversupply, with an excess of teachers who are unable to secure regular teaching employment. In large part, the

oversupply has created a problem of significant underemployment of the substitute teacher workforce, which is explored later in this study.

Given the initial labour market condition of oversupply, the interpretation of the demand and supply projections suggest that there will be continued, or worsening, oversupply from 1998-99 through 2002-03. In this five year (inclusive) period demand is projected to total 1,606 teachers compared to a new supply of 2,900. Even though demand is anticipated to exceed supply in the period from 2003-04 through 2006-07, there will not be significant relief for the oversupplied market. Total annual demand for teachers in these four years is 2,577 compared to a total new supply of 2,320; a difference of only 257 teachers.

5.3 Supply of Teachers by Subject Area

Table 11 contains the number of individuals obtaining Nova Scotia teaching certification, according to their respective academic major and associated subject cluster in the years 1992 through 1998. An academic major comprises at least 30 credit hours of post-secondary study. In some instances an individual has more than one major and would be counted more than once. Most of the subject areas correspond to secondary school curriculum endorsement. Included in the subject listing is "other subjects," which generally relates to elementary grade endorsement.

During the period 1992 through 1998 there has been a notable consistency in the pattern of academic majors of prospective teachers obtaining certification. Among secondary subject clusters English, Social Studies, and Physical Education dominate with 62% of the total majors. Within clusters there is also a tendency for subject prominence. This is most evident in the cases of History (53%) within the Social Studies, Biology (64%) within the Sciences, and Music (90%) within the Fine Arts.

Table 12 compares the subject cluster distribution of endorsements with the projected average annual demand for teachers in the six year (inclusive) periods 1998-99 through 2003-04 and 2004-05 through 2009-10. Given the information available, it is uncertain whether the English or French majors would be destined to teach English or French as first language subject or as a foreign language. The table indicates a significant mismatch in both six year spans between the number of new teachers by academic major and the projected demand for teachers by subject cluster. If this pattern of academic majors for new teachers continues, then the supply of teachers will be approximately three times the future demand for Fine Arts majors and English majors, four times the demand for Social Studies majors, and as high as ten times the demand for Physical Education majors. While it appears that the supply of new Science teachers will be three times the demand, the over representation of Biology majors in the supply of this group may suggest that there will be a shortage of Physics and Chemistry majors. The supply of mathematics majors will be nearly one-third the projected demand. Also significantly under supplied will be new teachers of Technology Education and Family Studies.

According to the 1998 pattern of teaching certificates by subject major, the number of new teachers with an academic background suitable for elementary education would be 84% higher than projected demand in 1998-99 through 2003-04, but would fall 15% short of demand in the 2004-05 through 2009-10 period.

The apparent imbalances of supply and demand by academic subject are indicative of a situation where there are both shortages and excesses of new teachers at the same time. Those with academic capabilities that are plentiful will tend to have difficulty obtaining suitable employment and

will not likely be able to establish themselves in a teaching career. Conversely, new teachers with subject capabilities that are in strong demand compared to supply should not face a similar difficulty.

5.4 Substitute Teacher Labour Market

Substitute teachers are used to replace regular teachers on a daily basis who are absent due to short-term illness, other personal short-term leave, and professional development. Substitute teaching is considered an entry-level position for new teachers. Table 13 contains available information on the number of substitute teachers⁴, where they came from in terms of previous teaching employment, and their transition to permanent teaching positions, for the school years 1992-93 through 1997-98.

The total number of substitute teachers has declined moderately in the 1992-93 through 1997-98, from 2,487 to 2,167, a decline of 13%. In this regard the decline parallels the concurrent 12% decrease in the number of permanent/probationary teachers. On average substitutes teach a relatively few number of days per year, ranging from a low of 45 days in 1994-95 to a high of 52 in 1997-98. The median number of substitute days taught, ranging from 28 to 39 days in the period, is significantly lower than the average. This indicates that the teaching days taught, as low as they are, are concentrated in significantly fewer than one-half of the substitute teachers.

The source of substitute teachers appears to be dominated by new entrants to the profession in Nova Scotia. For the period from 1992-93 through 1997-98 about one-third of the substitute teachers did not teach in Nova Scotia public education in the previous year. Another significant source was former term teachers who reverted to substitute status, comprising 5.3% of the total. Former probationary/permanent teachers constituted 2.8% overall, peaking at 7.2% in 1993-94, the year before the flat rate per diem remuneration for teachers (then \$100) was instituted.

As noted previously, the progression of substitute teaching to a regular teaching position is tenuous. Recently the probability of a substitute teacher being employed as a permanent/probationary teacher within two years is roughly 5%. Logically this is the primary cause of the high rate of attrition of substitute teachers from Nova Scotia public education. From 1992-93 through 1996-98 the annual number of substitute teachers who did not teach in the subsequent year ranged from 506 in 1992-93 to 645 in 1994-95. This represented from 20% to 27% of the actively working substitute teachers. Long-range analysis of work patterns indicates that once substitute teachers leave Nova Scotia public education for one year they do not return in later years.

The factor of substitute teacher attrition is a serious drain on the supply of new teachers. Attrition of substitute teachers approximately equals regular teacher retirements as a loss of the teaching endowment in Nova Scotia. Available figures indicate that from 1992 through 1996 as much as 88% of all substitute of teachers left the Nova Scotia public education labour force.

Pool of Potential Teachers

Many substitute teachers who have left the Nova Scotia public education labour force would likely

⁴ This information relates to teachers who worked only as substitutes in a year, and who each had at least one substitute teaching assignment in the year, which could have been as short as one day. In this study, a teacher with both substitute and term assignments in a year would be counted as a term teacher. The recent increased employment of term teachers would lead to an undercounting of teachers working as substitutes in the year. It should also be noted that prospective substitute teachers who are not able to obtain any substitute teaching employment are not be represented in this information.

be available for employment if suitable teaching positions become available. There may be over 3,000 individuals in this category. There is also a potential supply of teachers in the untold number of recipients of Nova Scotia teacher certification who never had an opportunity to teach in the province, not even as a substitute. It is evident, however, that to realize this potential the remuneration, working conditions, and long-term employment prospects must be sufficient to entice former substitute teachers, and prospective substitutes, away from their current employment or other engagement. Further, this supply component will have to be recruited because they are not routinely submitting employment applications to school boards.

Appropriate Supply of Substitute Teachers

An appropriate supply of substitute would be one which

- is large enough to fill the need of school boards to replace regular teachers on short-term absences (particularly during peak absentee periods) and permanent teachers taking longer-term leaves
- is of sufficient mix and geographic distribution to meet needs by subject and region

However, without an adequate intermediate income opportunity and the incentive of obtaining a permanent teaching position, the rate of attrition of substitute teachers will be high and, in the long-run, will discourage prospective new teachers from training for the profession. Further, with improvement of Nova Scotia's economy there will be competing career opportunities that potential teachers can pursue.

One method to provide a reasonable income to substitute teachers is to concentrate the available opportunities for substitute and term work. In this regard, it is unrealistic to expect all substitute teachers to be able to work a full year of 195 days because the need for substitute teachers is uneven during the year. For example, the demand increases markedly during the winter 'flu season', and there is a need for a sufficient number of substitute teachers to meet the peak requirements in various regions. However, the present utilization of substitute teachers suggests a regular teacher absentee rate of less than 7.5%. On this basis, the number of substitute teachers is currently nearly twice the number needed to allow for average earnings of \$10,900 with 100 days of teaching, or three times the number needed to allow for average earnings of \$19,075 with 175 days of teaching (casual substituting is remunerated at \$109 per day).

However, it must be recognized that sufficient substitutes are needed to fill in at given times when the teacher absence rate is at its peak. In South West Regional School Board, for which detailed data was available, the peak rate is 8%-9% (including all types of absences) based on information from 1997-98 and 1998-99. This compares to the annual absentee rate of 6.4% for elementary and secondary teachers in Canada in 1997 which includes illness and personal or family responsibilities (absences due to maternity leave or professional development are excluded). Given the projected teacher population and an estimated peak absentee rate of 10%, the required number of substitutes can also be projected. It should be noted that projections do not take into account availability of the substitutes, subject qualifications, or geographic location. Taking these factors into account, an indeterminate additional number would likely be required at peak times.

In projecting the supply of the substitute teacher workforce, attrition is an important consideration. It is assumed that attrition of substitutes will decrease as regular teaching employment prospects improve and vice versa. Table 14 outlines projected supply of substitutes factoring in selected attrition rates that vary with the labour market prospects for regular teachers. Comparing this to projected required substitutes the following summarizes the estimated excess supply or demand for substitutes.

Figure 14. Estimated Excess Supply or Demand for Substitutes

	1999- 2000	2000- 2001	2001- 2002	2002- 2003	2003- 2004	2004- 2005	2005- 2006	2006- 2007	2007- 2008	2008- 2009	2009- 2010
Supply	2132	1930	1629	1419	1246	1075	898	800	798	869	950
Demand	985	975	961	950	937	925	913	901	887	871	858
excess supply (+) or demand(-)	1147	956	668	469	309	151	-15	-101	-90	-2	92

Managing the Substitute Teacher Workforce

The interaction of demand and supply of new teachers will not automatically resolve the issue of substitute teacher low income and underemployment, and the resulting problem of attrition. This fact is demonstrated above. As detailed in Table 15, the outlook is for the substitute teacher workforce to steadily decline from approximately 2,200 individuals in 1998-99 to 798 in 2007-08, and increase somewhat thereafter. By 2005-06 the supply of substitutes is not expected to meet peak demand.

The solution to the problem of attrition of substitute teachers will likely be the result of changes in the management of the substitute teacher workforce by teacher education institutions and school boards. The role of the teacher education institutions is to align the academic background of new teachers with demand requirements. As noted previously, this would mean significantly reducing the number of Bachelor of Education graduates with academic majors in subjects such as English, Social Studies, Physical Education, and Fine Arts, and increasing the number with academic majors in Mathematics, Physical Sciences, Technology Education, and Family Studies. This would also affect the substitute teacher workforce because the academic skills available would better match the requirements of substitute work. Also, in the longer term, school boards would find it easier to hire new regular teachers because the academic skills needed to fill the demand would already be reasonably adequately represented in their pools of substitute teachers.

From the school board perspective managing the substitute teacher workforce implies that there is an adequate maximum number of substitute teachers likely to be required at any time during the school year. One management option is to contract a sufficient, but not excessive, number of substitute teachers to meet probable peak demand. Once a practical number is determined, however, mechanisms would be required to reasonably balance the workload of substitute teachers and/or adjust their remuneration, so substitute teachers will have an incentive to remain in the Nova Scotia public education teacher labour market.

6. CONCLUSIONS OF THE TEACHER DEMAND AND SUPPLY STUDY

This study of Nova Scotia public education teacher demand and supply has examined the topic from a number of perspectives. There are several conclusions which can be made, some are clear while others must be made with the reservation that unforeseen events may alter outcomes envisioned in this study. Because the situation of teacher supply and demand is crucial for the effective delivery of public education in the province, the factors discussed in this study should be reviewed from time-to-time to update the picture of the changing environment. The Nova Scotia Department of Education is fortunate in having information systems that track the activity of the teacher workforce and can account for the certification of new teachers. Also, Nova Scotia has the benefit of effective communications among the parties that constitute the employers, suppliers,

regulators, and collective bargaining representative of the province's public education teachers. The conclusions below relate to the current condition and outlook for the public education teacher labour market in Nova Scotia. As was noted in the introduction of this study, the conclusions are neutral with regard to policies that might be instituted, although the study attempts to provide an understanding of the teacher demand and supply situation upon which policies can be developed.

Nova Scotia:

1. As a group, teachers in Nova Scotia represent a significant component of the province's workforce, comprising about 3% of the total. Teachers are also prominent in the workforces of other jurisdictions in Canada and the United States.
2. The current instances of difficulty in recruiting qualified teachers in certain subjects, and engaging substitute teachers more generally, that are being reported by school administrators in Nova Scotia are a sign of a tightening teacher labour market in the province compared to a traditional condition of substantial oversupply. The tightening is due, at least in part, to the rationalization of the teacher education programs in Nova Scotia instituted in 1994, which over a four year period reduced the number of Bachelor of Education graduates from 900 to approximately 350 per year.
3. The demand for teachers in Nova Scotia over the next decade will initially be small, as low as 98 in 1999-2000, in the wake of the Early Retirement Incentive Program. In the school year 2001-02 and after, the demand for teachers will increase as more of the aging teacher workforce becomes eligible to retire. Peak demand will be in 2005-06 at 705. In total about 54% of present teachers will retire during the next decade. Moderating the impact of retirements is reduced public school enrolment, and requirement for teacher positions, projected to decline 15% in the period.
4. The supply of new teachers is in the range of 580 annually, comprised of graduates from Nova Scotia teacher education programs as well as new teachers trained out of the province. (This total is net of about 20% of graduates from provincial education programs who have a home address outside of Nova Scotia.) Forty-five percent of the out-of-province trained teachers are residents of Nova Scotia.
5. The teacher labour market has been characterized by oversupply since the early 1970s, and continues to the present time. The projections of demand and supply suggest that there will be continued, or worsening, oversupply from 1998-99 through 2002-03. Even though demand is anticipated to modestly exceed new supply in the period from 2003-04 through 2006-07, this will not overturn the oversupplied condition of the labour market.
6. There is a serious issue regarding the supply on new teachers at the secondary level, because it is dominated by English, Social Studies, and Physical Education majors. The supply of teachers in these subjects represents up to 10 times the demand. Concurrently, there is a shortage of new teachers capable of teaching Mathematics, Physical Sciences, Technology Education, and Family Studies. This has and will, if uncorrected, result in a situation where there are both shortages and excesses of teachers at the same time.
7. Currently, and in the past, the supply of teachers in Nova Scotia has been substantially drained by the attrition of substitute teachers. Substitute teaching is often the first assignment of new teachers. Attrition of substitute teachers is in excess of 500 individuals annually. The present pool of substitute teachers, approximately 2,200 individuals, is too large given the amount of substitute teaching work available. As a result, substitute teachers work on average only about 52 days per year. Further, their remuneration is most often limited to \$109 per day, substantially

below that of a regular teacher. Contributing to the problem of the unemployment of substitute teachers is that many do not have an academic background that is appropriate to teach the subjects required. The probability of a new teacher going from the status of substitute to probationary-permanent teacher within 2 years is about 5% (see footnote 3). With the prospect of low earnings and very little opportunity for a permanent teaching assignment, the majority of new teachers who start as substitutes drop out of the public education teaching profession in Nova Scotia.

8. Coupled with high attrition of substitute teachers is the need to consider a sufficient supply to fill in at peak absentee periods of teachers. It is projected that the supply of substitutes will decline through to 2007-08, such that the pool will not be sufficient to meet demands during peak absenteeism in the period beginning in 2005-06. Management options to maintain an adequate supply of substitutes to meet peak, regional, and subject needs are warranted.

Related Labour Market Conditions in Other Provinces and the United States:

9. Because of similarities in the delivery of education and teaching qualifications, and the potential for regional mobility of teachers, there is a degree of interaction among the teacher labour markets in Nova Scotia and those in other jurisdictions of Canada and the United States. Nova Scotia represents a small share of the Canadian, and the combined Canadian – United States, teacher labour markets and is potentially vulnerable to demand and supply conditions outside of the province. School boards in Nova Scotia are disadvantaged when recruiting new teachers from teacher education programs in the province because they cannot offer employment contracts until August, just prior to the beginning of classes. School jurisdictions outside of Nova Scotia can offer employment as early as the spring.
10. Overall, teacher labour markets in Canada and the United States are not currently experiencing shortages. In recent years provinces in Canada, and some jurisdictions in the United States, have offered early retirement programs to experienced teachers to create employment opportunities for new teachers. Selective shortages are being reported in Canada and the United States for teachers of specific subjects such as Science and Mathematics. The demand for Special Education teachers is strong in the United States. In addition, school districts in the United States are having difficulty staffing teaching positions located in areas characterized by low teacher earnings, high crime, high poverty, and/or extreme remoteness. School authorities from other provinces and the United States are recruiting graduates from Nova Scotia teacher education programs to meet specific requirements. In some cases, school districts in the United States are offering unique incentives to attract new teachers.
11. Attention is being given to a possible future shortage of teachers because in many provinces and areas of the United States approximately one-half of the present teacher workforce will become eligible to retire during the next decade. In Canada, the prospect of many teachers retiring will be partially offset by declining school enrolments. In the United States, enrolments are expected to increase. Teacher education programs should be able to increase supply to meet demand if they can attract applicants with the prospect of suitable teaching employment opportunities upon graduation.

Appendix A

TABLES

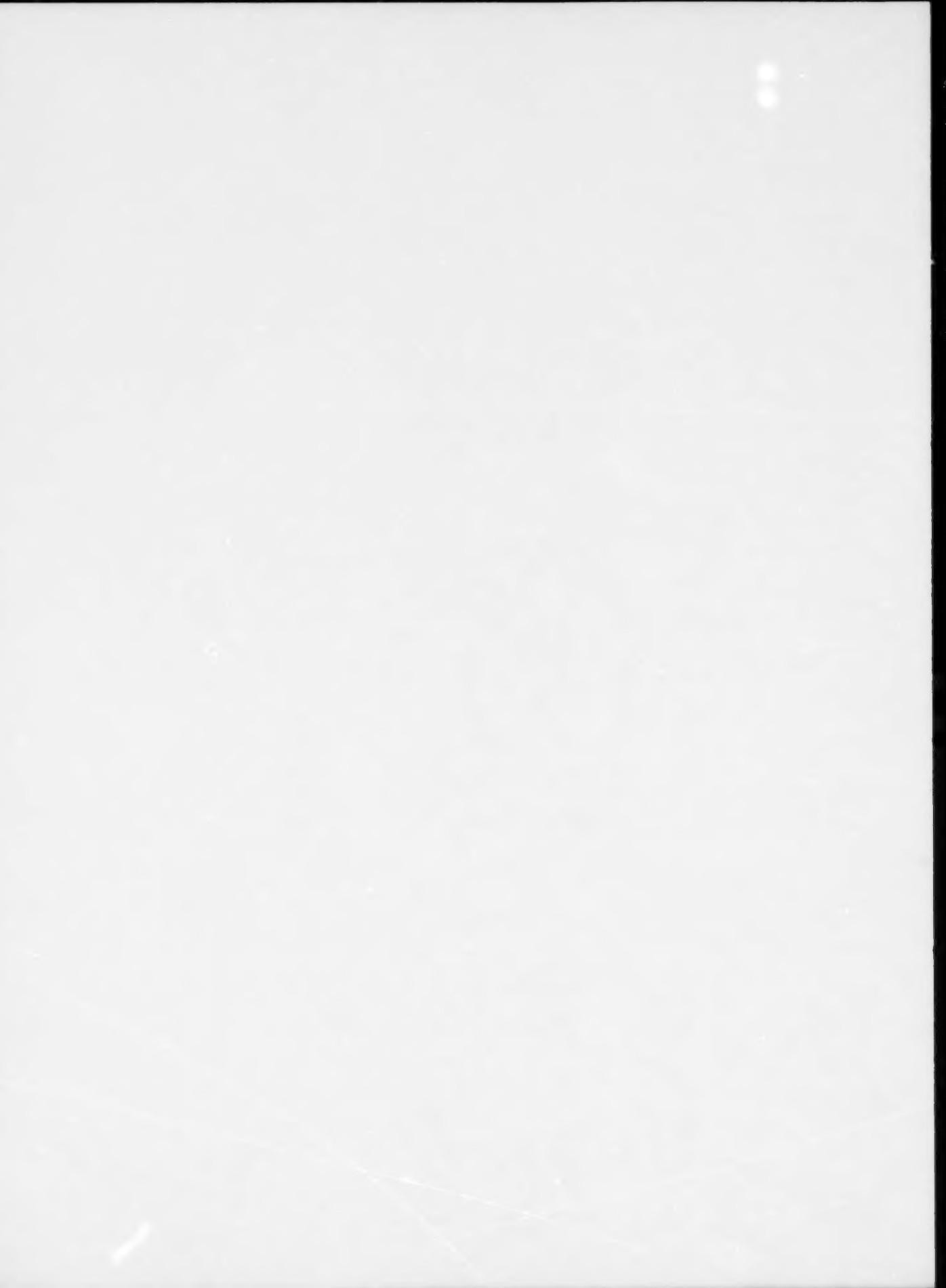


TABLE 1A
****TEACHERS BY BOARD - 1997-98**

<u>Teacher Status*</u>	Cape Breton-Victoria	Strait	Chignecto-Central	Halifax	Annapolis Valley	Southwest	CSAP	Total
Permanent	1,270	616	1,424	2,792	854	958	226	8,140
Probationary	23	36	54	69	65	55	44	346
Term	122	49	217	700	204	145	47	1,484
Substitute	335	222	361	701	265	216	67	2,167
Total	1,750	923	2,056	4,262	1,388	1,374	384	12,137

NOTE:

* Includes classroom teachers, speciality teachers, counselors, and teacher-certified administrators.

Excludes teachers on leave.

** Based on regular teachers working 195 days per year.

TABLE 1B
ENROLMENT, TEACHERS AND SCHOOLS BY BOARD - 1997-98

<u>Board</u>	<u>Enrolment</u>	<u>Number of Teachers</u>	<u>Full-Time Equivalents (FTE)</u>	<u>Student-Teacher (FTE)Ratio</u>	<u>Number of Schools</u>	<u>Average Number of Students per School</u>	<u>Average Number of Teachers per School</u>
Cape Breton-Victoria	23,394	1,374	1,362.4	17.2	74	316	18.4
Strait	11,156	688	684.4	16.3	28	398	24.4
Chignecto - Central	27,716	1,673	1,602.1	17.3	89	311	18.0
Halifax	58,348	3,460	3,312.0	17.6	140	417	23.7
Annapolis Valley	18,458	1,085	1,028.7	17.9	43	429	23.9
Southwest	19,105	1,141	1,105.3	17.3	67	285	16.5
CSAP	4,182	308	301.2	13.9	21	199	14.3
TOTAL	162,359	9,729	9,396.1	17.3	462	351	20.3

TABLE 2**CLUSTERING OF SUBJECTS INTO TEACHER LABOUR MARKET SEGMENTS**

Subject Cluster	Discipline/Subject
1. Teacher-Certified Educ. Administrator	
2. Elementary School Teacher	Grades Primary through 6
3.. English (first language)	English
4. French (first language)	French
5. Languages	English (second language) French (second language) Latin German Spanish Gaelic Mi'kmaq
6. Social Studies	History Geography Political Science Sociology Economics Law Classics African Canadian Studies Mi'kmaq
7. Mathematics	Mathematics
8. Science	Biology Chemistry Physics Geology/ Earth Sciences Oceanography Environmental Studies
9. Physical Education/ Health Education	Physical Education
10. Health Education	Health
11. Fine Arts	Visual Arts Music Drama Dance Theatre Arts
12. Technology Education	Technology Education Computer Science
13. Business Education	Business Administration Commerce Marketing Accounting Finance Organizational Behavior Secretarial Arts
14. Family Studies	Human Ecology Home Economics Food Science

Source: Teacher Certification in Nova Scotia: The Report of the Teacher Certification Review Committee,
p.16(modified for this study)

TABLE 3

**HIGH SCHOOL TEACHING FULL-TIME EQUIVALENTS,
AVERAGE CLASS SIZE, AND ENROLMENTS IN SELECTED
COMPULSORY SUBJECTS**

All Subjects	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Total FTE	2,159	2,187	2,090	2,027	1,980	1,981
Enrolment	40,400	40,600	39,800	39,500	40,100	39,600
Avg. Class Size	24	24	23	24	24	24

Estimated Enrolments by Selected Subject(Figures **bolded** for years with increased compulsory credits)

	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98
Global Studies (1 credit)						
Social Studies	N/A	47,300	47,900	50,500	51,000	48,000

Career & Life Management & Physical Active Life Styles (total of 1 credit)

Personal Development	N/A	> 100	100	200	11,000	20,500
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Mathematics (1 credit plus option of additional 1 credit)

Mathematics	N/A	39,000	38,400	37,690	38,100	37,200
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Science (1 credit plus option of additional 1 credit)

Science	N/A	51,100	50,700	50,400	49,600	48,500
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Data Processing, Industrial Arts, or Word/Information Processing (option of 1 credit for group)

Computer Studies	N/A	8,300	9,000	9,500	9,600	9,000
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Industrial Arts Technology	N/A	5,700	6,300	6,500	8,100	7,800
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Business Education*	N/A	16,600	16,700	16,600	16,200	13,800
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* includes Word/Information Processing

TABLE 4**TARGET CHANGES IN CLASS SIZE BY GRADE LEVEL AND SCHOOL BOARD**

School Board	Target Type	Students per Class 1997-98	Students per Class 2001-02
Annapolis Valley	Average		
Primary - Grade 3		24.5	17.5
Grades 4-6		24.5	21.0
Junior High		24.8	21.0
High School		24.3	21.0
Cape Breton - Victoria	Maximum		
Primary - Grade 3		28/30	22/25
Grades 4-6		30.0	25.0
Junior High		33.0	28.0
High School		33.0	28.0
Chignecto - Central	Average		
Primary - Grade 3		25.0	20.0
Grades 4-6		26.0	23.0
Junior High		26.0	23.0
High School		26.0	25.0
Halifax	Average		
Primary - Grade 3		22.6	18/20
Grades 4-6		30.0	25.0
Junior High		26.0	23.0
High School		27.0	23.0
Southwest	Average		
Primary - Grade 3		23.7	20/23
Grades 4-6		23.7	23.0
Junior High		22.6	21.6
High School		21.6	23.0
Strait	Maximum		
Primary - Grade 3		28/30	20/24
Grades 4-6		30.0	28.0
Junior High		35.0	30.0
High School		35.0	30.0
CSAP	Average		
Primary - Grade 3		19.8	17.5
Grades 4-6		19.8	21.0
Junior High		19.3	21.0
High School		18.5	26.0

TABLE 5
ACTUAL AND PROJECTED PUBLIC SCHOOL ENROLMENTS

Nova Scotia	1992-93	Projections				% Change (% annual growth rate)		
		1998-99		2003-04	2009-10	1992-93	1998-99	2003-04
		1998-99	2003-04	1998-99	2003-04	1998-99	2003-04	2003-04
Elementary	86,917	82,993	74,751	70,154	-4.5 (-0.8)	-9.9 (-1.7)	-6.1 (-1.0)	
Junior High	38,754	38,246	37,227	31,683	-1.3 (-0.2)	-2.7 (-0.4)	-14.9 (-2.5)	
High School*	40,441	38,772	37,693	34,326	-4.1 (-0.7)	-2.8 (-0.5)	-8.9 (-1.5)	
Total	166,112	160,011	149,671	136,163	-3.7 (-0.6)	-6.5 (-1.1)	-9.0 (-1.5)	
 Cape Breton - Victoria	 22,441	 19,040	 16,449			 -15.2 (-2.5)	 -13.6 (-2.3)	
Strait	10,758	9,144	7,538			 -15.0 (-2.5)	 -17.6 (-2.9)	
 Chignecto - Central	 27,275	 25,254	 23,327			 -7.4 (-1.2)	 -7.6 (-1.3)	
 Halifax	 58,297	 57,646	 53,761			 -1.1 (-0.2)	 -6.7 (-1.1)	
 Annapolis Valley	 18,219	 16,969	 15,247			 -6.9 (-1.1)	 -10.1 (-1.7)	
 Southwest	 18,797	 17,242	 15,573			 -8.3 (-1.4)	 -9.7 (-1.6)	
 CSAP	 4,254	 4,376	 4,268			 2.9 (0.5)	 -2.5 (-0.4)	

* Includes vocational students from Memorial.

TABLE 6
ATTRITION OF REGULAR TEACHERS

Number of Regular Teachers Employed in the School Year

Actual or Estimated*	1993-94	1994-95	1995-96	1996-97	1997-98
Scheduled	918	374	338	339	422
Retirement	0	0	20	29	30
Disability					
Pension					
Occupational*	94	105	112	133	122
Mobility					
Deceased	12	10	5	8	18
Total	1024	489	475	509	592

Projected	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10
Scheduled	120	62	209	477	513	587	601	671	604	529	444	389
Retirement												
Disability												
Pension												
Occupational												
Mobility												
Deceased	10	10	10	10	10	10	10	10	10	10	10	10
Total	270	212	359	627	663	737	751	821	754	679	594	539

* Estimated on the basis of regular teachers who did not continue teaching and who did not retire, did not receive a disability pension, or did not die.

TABLE 7

PROJECTED DEMAND FOR TEACHERS BY REASON

<u>Other Factors</u>	<u>1998-99</u>	<u>1999-00</u>	<u>2000-01</u>	<u>2001-02</u>	<u>2002-03</u>	<u>2003-04</u>	<u>2004-05</u>	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>	<u>2008-09</u>	<u>2009-10</u>	<u>Total</u>
<u>SECONDARY</u>													
Changing Enrollment	-51	-34	-19	-18	1	-42	-54	-55	-67	-98	-127	-74	-638
Disability Pension	9	9	9	9	9	9	9	9	9	9	9	9	108
Occupational Mobility	53	53	54	54	55	55	55	55	54	54	53	53	650
Deceased	4	4	4	5	5	5	5	5	5	5	4	4	55
Total	15	32	48	50	70	27	15	14	2	-30	-60	-8	175
<u>ELEMENTARY</u>													
Changing Enrollment	6 *	-69	-80	-101	-106	-72	-59	-50	-42	-26	-22	-40	-661
Disability Pension	9	9	9	9	9	9	9	9	9	9	9	9	108
Occupational Mobility	56	55	55	54	54	53	53	53	54	54	55	55	651
Deceased	5	5	5	5	4	4	4	4	4	5	5	5	55
Total	76	0	-11	-33	-39	-6	7	16	25	42	47	29	153
<u>ADMINISTRATION</u>													
Changing Enrollment	-13	-11	-10	-13	-11	-12	-12	-11	-11	-13	-16	-12	-145
Disability Pension	2	2	2	2	2	2	2	2	2	2	2	2	24
Occupational Mobility	12	12	12	12	12	12	12	12	12	12	12	12	144
Deceased	1	1	1	1	1	1	1	1	1	1	1	1	12
Total	2	4	5	2	4	3	3	4	4	2	-1	3	35
Total Other Factors	93	36	42	19	35	24	25	34	31	14	-14	24	363
Scheduled Retirement	120	62	209	477	513	587	601	671	604	529	444	389	5,206
TOTAL DEMAND	213	98	251	496	548	611	626	705	635	543	430	413	5,569

* Includes 77 teachers to reduce class size.

TABLE 8

SCHEDULED RETIREMENTS BY SCHOOL BOARD

	<u>1998-99</u>	<u>1999-00</u>	<u>2000-01</u>	<u>2001-02</u>	<u>2002-03</u>	<u>2003-04</u>	<u>2004-05</u>	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>	<u>2008-09</u>	<u>2009-10</u>	Total
Cape Breton-Victoria	32	7	38	95	109	116	128	135	78	70	55	34	897
Strait	5	5	19	46	43	53	38	50	34	38	25	31	387
Chignecto - Central	14	13	27	49	64	81	79	81	119	78	74	85	764
Halifax	45	25	84	174	183	217	219	243	225	206	186	140	1947
Annapolis Valley	15	3	17	54	51	41	56	73	66	57	52	49	534
Southwest	9	6	21	45	54	62	67	73	68	60	46	39	550
CSAP	0	3	3	14	9	17	14	16	14	20	6	11	127
TOTAL	120	62	209	477	513	587	601	671	604	529	444	389	5206

TABLE 9

PROJECTED DEMAND FOR TEACHERS BY SUBJECT / ADMINISTRATION

	1998-99 Through 2003-04			2004-05 Through 2009-10		
	Other		Total	Other		Total
	Retire	Factors(1)		Retire	Factors(1)	
Secondary (2)						
English - 1st. Lang.	114	29	143	154	-8	146
French - 1st Lang.	4	1	5	5	0	5
Languages	58	17	75	78	-5	73
Social Studies	144	29	173	173	-9	164
Mathematics	116	31	147	191	-9	182
Science	109	30	139	142	-9	133
Physical Ed. / Health Ed.	25	11	36	64	-2	62
Fine Arts	26	12	38	57	-4	53
Technology Education	63	15	78	83	-4	79
Business Education	30	6	36	32	-1	31
Family Studies (3)	55	17	72	114	-5	109
Other Subjects	5	1	6	2	0	2
Ed. Support & Guidance	73	18	91	118	-6	112
Resource	48	17	65	105	-5	100
Special Education	12	5	17	21	-1	20
Total Secondary	882	239	1,121	1339	-68	1271
Elementary						
General & Subjects	688	-13	675	1,303	150	1,453
Resource	65	-1	64	142	15	157
Other	57	0	57	103	1	104
Total Elementary	810	-14	796	1,548	166	1,714
Administration	277	17	294	352	11	363
Grand Total	1,969	242	2,211	3,239	109	3,348

Note: Subject distribution is estimated on the basis of the hours teaching, support, and administrative activities recorded for 93% of regular teachers in 1997-98. Teachers whose activities were not recorded were on leave for all or part of the year, or through oversight. Hours by recorded activity for teachers are combined and adjusted to estimate FTEs for all teachers.

(1) 'Other Factors' combine changing enrolment, disability pension, occupational mobility, and death.

(2) Secondary also includes teachers with assignments in both secondary and elementary grades.

(3) Family Studies also includes the courses Physically Active Lifestyles and Career and Life Management.

TABLE 10

**NOVA SCOTIA TEACHER CERTIFICATES ISSUED
BY LOCATION OF EDUCATION INSTITUTION**

Number of Recipients by Location of Teacher Education Program	1992	1993	1994	1995	1996	1997	1998*	Total
Graduates of Nova Scotia Institutions	518	612	653	620	422	534	379	3,738
Graduates of Institutions Outside Nova Scotia								
From other Atlantic Provinces	116	126	119	122	142	174	124	923
From other Canadian Provinces	53	57	64	84	84	72	115	529
From Maine	0	18	13	56	49	43	76	255
From other United States	6	7	11	8	7	2	12	53
From other Countries	10	7	4	10	6	12	11	60
Total	185	215	211	280	288	303	338	1,820
Total Number of New Certifications	703	827	864	900	710	837	717	5,558
Less: Graduates of Nova Scotia institutions with a home address outside Nova Scotia								
	186	184	183	143	76	101	75	948
Equals: Available Nova Scotia Supply	517	643	681	757	634	736	642	4,610

Note: Type 1 certificates, excludes non-classroom specialties such as psychologist. In 1998 there were 17 non-type 1 certificates issued.

* Data for 1998 are preliminary and subject to small modification.

TABLE 11
ACADEMIC MAJORS OF TEACHER CERTIFICATION RECIPIENTS

SUBJECT / DISCIPLINE *	1992	1993	1994	1995	1996	1997	1998
English	96	80	95	107	66	110	94
French	56	44	52	51	62	60	39
Other Languages		4	1	2	1	4	8
Latin							
German		2	1	1		1	1
Spanish		2			1		2
Gaelic							
Mi'kmaq				1		3	5
Social Studies	103	104	105	108	90	101	123
History	52	63	51	57	44	58	62
Geography	12	11	12	15	7	5	6
Political Science	18	9	17	19	16	9	17
Sociology	20	20	18	11	18	23	28
Economics	1	1	4	4	3	1	3
Law					1		
Classics			3	1	1	2	2
African Canadian Studies					1	3	5
Mi'kmaq							
Mathematics	22	18	27	28	6	17	11
Science	84	58	74	62	40	54	65
Biology	54	38	54	38	17	38	42
Chemistry	16	10	11	13	9	12	13
Physics	6	6	4	4	7	2	5
Geology/ Earth Sciences	6	3	4	6	6	2	3
Oceanography							
Environmental Studies	2	1	1	1	1		2
Physical Education	74	84	111	114	99	106	96
Health Education			1	1			25
Fine Arts	29	19	32	25	30	34	25
Visual Arts	1	1	2		1	2	1
Music	26	18	28	24	27	30	20
Drama	1		1	1	2	2	2
Dance							1
Theatre Arts	1		1				1
Technology Education	1	1	11	3	2	1	1
Technology Education	1		10	3		1	1
Computer Science			1		2		
Business Education	8	3	9	9	9	6	6
Business Administration	4	2	6	5	5	2	3
Commerce	4		2	2	2		1
Marketing				1		1	1
Accounting			1			1	
Finance				1	1	2	1
Secretarial Arts		1			1		
Family Studies	9	10	10	8	3	6	5
Human Ecology		3		3	1	2	0
Home Economics	5	2		3	2	1	4
Food Science	4	5		2		3	1
Other Subjects	247	419	348	403	318	365	244
Total	729	844	876	921	726	864	742

* Note: in a few instances recipients of Teaching Certification have more than one academic major, and are included in the table more than once.

TABLE 12
**COMPARISON OF INITIAL TEACHING CERTIFICATES ISSUED IN 1998
WITH PROJECTED DEMAND FOR TEACHERS BY SUBJECT / ADMINISTRATION**

	Average Annual Demand					
	1998		1998-99 Through <u>2003-04</u>		2004-05 Through <u>2009-10</u>	
		<u>Teaching Certificates</u>				
Secondary ⁽¹⁾						
English	94	12.7%	24	6.5%	25	4.5%
French	39	5.3%	1	0.3%	1	0.2%
Languages	8	1.1%	13	3.5%	12	2.1%
Social Studies	123	16.6%	29	7.8%	28	5.0%
Mathematics	11	1.5%	25	6.7%	31	5.5%
Science	65	8.8%	23	6.2%	22	3.9%
Physical Ed. / Health Ed.	121	16.3%	6	1.6%	10	1.8%
Fine Arts	25	3.4%	6	1.6%	9	1.6%
Technology Education	1	0.1%	13	3.5%	13	2.3%
Business Education	6	0.8%	6	1.6%	5	0.9%
Family Studies ⁽²⁾	5	0.7%	12	3.2%	18	3.2%
Other Subjects		0.0%	1	0.3%	-	
Ed. Support & Guidance		0.0%	15	4.0%	19	3.4%
Resource			11	3.0%	17	3.0%
Special Education		0.0%	3	0.8%	3	0.5%
Total Secondary	498	67.1%	188	50.7%	213	38.1%
Elementary						
General & Subjects	244	32.9%	113	30.5%	242	43.3%
Resource		0.0%	11	3.0%	26	4.7%
Other		0.0%	10	2.7%	17	3.0%
		0.0%		0.0%		0.0%
Total Elementary	244	32.9%	134	36.1%	285	51.0%
Administration						
Grand Total	742	100.0%	371	100.0%	559	100.0%

* Rounded to nearest whole number. Numbers may not add to totals because of rounding.

(1) Secondary also includes teachers with assignments in both secondary and elementary grades.

(2) Family Studies also includes the courses Physically Active Lifestyles and Career and Life Management.

TABLE 13**SUBSTITUTE TEACHER TRANSITIONS**

	<u>1992-93</u>	<u>1993-94</u>	<u>1994-95</u>	<u>1995-96</u>	<u>1996-97</u>	<u>1997-98</u>
Teachers working only as Substitutes	2,487	2,486	2,382	2,392	2,338	2,167
<i>Average Number of Days Taught</i>	48	49	45	47	50	52
<i>Median Number of Days Taught</i>	33	33	28	32	35	39
Pervious Year Teaching Activity						
- Probationary / Permanent Teacher	-	62	116	50	44	51
- Term Teacher	-	114	102	172	121	106
- Did Not Teach in Nova Scotia	-	694	786	781	809	739
Next Year Teaching Activity						
- Probationary / Permanent Teacher	68	118	44	52	22	-
- Term Teacher	303	427	299	421	451	-
- Did Not Teach in Nova Scotia	506	566	645	559	594	-
- <i>Substitute Teacher Attrition Rate</i>	20%	23%	27%	23%	25%	-

TABLE 14

**ESTIMATED IMPACT OF THE ANNUAL DEMAND AND SUPPLY OF TEACHERS
ON THE SUBSTITUTE TEACHER WORKFORCE**

	<u>1998-99</u>	<u>1999-00</u>	<u>2000-01</u>	<u>2001-02</u>	<u>2002-03</u>	<u>2003-04</u>	<u>2004-05</u>	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>	<u>2008-09</u>	<u>2009-10</u>
Annual Demand for Regular Teachers (Including Administrators)	212	98	249	495	546	611	626	703	634	542	429	412
Annual Supply of New Teachers	580	580	580	580	580	580	580	580	580	580	580	580
Excess Supply (+) or Demand (-)	368	482	331	85	34	-31	-46	-123	-54	38	151	168
Estimated Substitute Teacher Workforce												
Assumed Attrition Rate*		25%	25%	20%	15%	10%	10%	5%	5%	5%	10%	10%
Estimated Substitute Teacher Workforce**	2200	2132	1930	1629	1419	1246	1075	898	800	798	869	950

*Percentage of those who taught as substitutes in the previous year who do not return in the current year.

** Estimated Substitute Teacher Workforce=Substitute teacher workforce in previous year minus attrition plus excess supply of teachers. (for 1999-00 the calculation is: 2200 - 0.25 x 2200 + 482 = 2132)

TABLE 15

PROJECTED ENROLMENTS AND TEACHER REQUIREMENTS

	<u>1997-98</u>	<u>1998-99</u>	<u>1999-00</u>	<u>2000-01</u>	<u>2001-02</u>	<u>2002-03</u>	<u>2003-04</u>	<u>2004-05</u>	<u>2005-06</u>	<u>2006-07</u>	<u>2007-08</u>	<u>2008-09</u>	<u>2009-2010</u>
Projected Enrollment	162,359	160,011	158,040	156,147	153,865	151,840	149,671	147,526	145,516	143,464	141,126	138,322	136,163
Regular Teachers Required*	9,970	9,912	9,854	9,745	9,613	9,497	9,371	9,246	9,130	9,010	8,873	8,708	8,582
Substitutes Available (Demand)**	997	991	985	975	961	950	937	925	913	901	887	871	858
Substitutes Available (Supply)	2,200	2,132	1,930	1,629	1,419	1,246	1,075	898	800	798	869	950	
Excess Supply (+) or Demand (-)	1,209	1,147	956	688	469	309	151	-15	-101	-90	-2	92	

* Assumes constant student-teacher ratios in elementary, junior high and high school; overall student-teacher ratio changes over time because of differing enrolment trends across the three levels.

** Assumes that a sufficient number of substitutes are required to meet the demand for substitutes when the absentee rate of regular teachers is 10%.



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